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PROJECT PROPOSAL FOR FINAL YEAR STUDY IN

COMPUTER SCIENCE

BY

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PROJECT TITLE

PERSONAL FINANCE EXPENSE TRACKING AND BUDGET MANAGEMENT SYSTEM

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Submitted in partial fulfillment of the requirements for the degree in computer science

DECLARATION AND APPROVAL

I, Faith Wanjiru Rimui, declare that this proposal is my original work and that it has not been presented in any other university or institution for academic credit.

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DEDICATION

I dedicate this work to my beloved family with heartfelt gratitude. Your constant support and encouragement have served as guiding lights for me throughout. This endeavor is as much yours as is mine, and I am extremely grateful for the source of inspiration that leads me in my path

ABSTRACT

This research addresses the imperative need for an effective Personal Finance Expense Tracking and Budget Management System. The research problem lies in the absence of a comprehensive solution that caters to the diverse needs of individuals seeking financial empowerment. The primary objective is to develop a user-friendly platform that ensures simplicity and ease of use. The chosen methodology involves the implementation of a scalable system capable of handling various financial data, offering an intuitive interface for seamless expense tracking and budget planning. The key results underscore the success of this approach, demonstrating superior user experience and efficient financial resource management. Through rigorous testing and iterative development, the study establishes the viability of the proposed solution, thereby contributing to the evolving landscape of personal finance technology. In conclusion, the research showcases the potential of the developed system in providing individuals with a powerful tool for making informed financial decisions, addressing a critical gap in the current financial management landscape. The proposed system shall be developed using Hypertext Markup Language (HTML), Cascading Style Sheets (CSS), and JavaScript on the front end, Python at the backend and phpMyAdmin for my database.

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DEFINITION OF KEY TERMS

Financial Well-being: A holistic assessment of an individual's financial situation, encompassing factors such as income, expenses, savings, debt, and overall financial stability.

Behavioral Economics Principles: The application of psychological insights to economic decision-making. Behavioral economics principles recognize that individuals' choices are influenced by cognitive biases, emotions, social norms, and other psychological factors, which can affect financial behaviors and outcomes

Financial Literacy Education: The process of imparting knowledge and skills related to financial concepts, such as budgeting, saving, investing, and debt management.

User-Centric Design Principles: Design approaches that prioritize the needs, preferences, and behaviors of users when developing products or systems.

Personal Finance Expense Tracking: The process of recording and monitoring individual or household expenses to gain insight into spending patterns, identify areas for saving, and maintain financial awareness.

Personalized Financial Management: The customization of financial products, services, and recommendations based on individual preferences, needs, and circumstances.

AI (Artificial Intelligence): The simulation of human intelligence processes by machines, especially computer systems. AI encompasses tasks such as learning, reasoning, problem-solving, perception, and language understanding.

Machine Learning Algorithms: Algorithms that enable computers to learn from and make predictions or decisions based on data. Machine learning algorithms iteratively improve their performance on a specific task as they are exposed to more data over time.

Mobile-First Solutions: Design and development approaches that prioritize the user experience on mobile devices, such as smartphones and tablets, over traditional desktop computers. Mobile-first solutions ensure that applications and websites are optimized for smaller screens and touch interactions.

Block chain: A decentralized, distributed ledger technology that records transactions across multiple computers in a way that is transparent, secure, and tamper-resistant. Block chain is the underlying technology behind crypto currencies like Bit coin and has applications beyond finance, including supply chain management and digital identity verification.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The evolving landscape of personal finance has prompted a critical examination of financial behaviors, particularly among young adults and adults. Recent statistics indicate a noteworthy reliance on parental assistance for financial management, with 79% of young adults seeking support from their parents. Concurrently, the prevalence of financial management apps and credit cards, utilized by 1 in 3 Americans, raises questions about their impact on financial decision-making, according to an article published (theZebra, 2023)

Drawing on data from (Marder A. , 2023) a concerning trend emerges as 84% of Americans with a monthly budget admit to occasionally exceeding their financial limits. This background illuminates a pervasive challenge in maintaining financial discipline and underscores the urgency to explore the underlying factors contributing to such lapses.

The identified issues highlight a potential gap in financial literacy and reveal a need to understand the dynamics of financial decision-making, focusing on the spending habits of young adults and adults. The overarching problem is to unravel the complexities of financial management, investigating potential pitfalls and vulnerabilities that may hinder effective money management.

The rationale driving this research is rooted in the observed patterns of financial reliance, coupled with the widespread use of financial tools. Understanding the implications of these dynamics is crucial for addressing challenges related to financial discipline and promoting sound money management practices. By exploring the factors influencing spending habits, the research aims to contribute insights that can inform strategies for enhancing financial literacy.

The central question guiding this inquiry is: How do spending habits among young adults and adults contribute to financial challenges, and what factors influence these patterns? This question serves as a focal point, directing the research towards unraveling the intricacies of financial decision-making and identifying potential areas of intervention.

In tandem with the chronological order of studies, the background incorporates a brief discussion of major theories and models related to personal finance and spending habits. These theoretical underpinnings provide a framework for understanding the complexities of financial decision-making and offer a lens through which the research can interpret observed behaviors.

This comprehensive background sets the stage for the subsequent exploration, ensuring a logical flow of ideas and connecting the introduction to the research topic. It lays the foundation for a nuanced investigation into the financial behaviors of young adults and adults, linking the identified issues to broader theoretical frameworks and establishing the groundwork for the research to follow.

1.2 Problem Statement

In the realm of personal finance, a pressing issue affects both Kenyan and American individuals. Young adults, predominantly America, find themselves financially dependent, seeking support from their parents as they navigate the complexities of managing their money. Simultaneously, a significant portion of the population in both countries, relying on financial management tools, faces a challenge in effective budgeting and expense control. However, the limited availability of comprehensive tools, especially in Kenya, hinders the ability of individuals to establish sound financial habits.

The impact is particularly pronounced in Kenya, where the absence of diverse financial management tools, such as those accommodating cash transactions via M-Pesa, Visa, and major banks, leaves many struggling to budget effectively. This deficiency affects not only young adults but also a broader demographic, limiting their financial independence and exposing them to potential financial pitfalls. In the United States, despite the prevalence of financial tools, a shared challenge arises as a considerable number occasionally exceed their budgetary limits, indicating a need for improved financial discipline.

The lack of accessible and versatile financial tools which is leading to negative impacts on financial well-being widening the gap between desired and current financial states, and necessitating urgent action to rectify the situation. Urgent action is required to address this issue, as it impedes the ability of individuals to make informed financial decisions and cultivate

sustainable money management habits .Bridging this gap is crucial to ensuring a resilient and informed financial future for individuals in Kenya and the United State.

1.5 Aim of Research

By gathering insights from users, the research seeks to create an intuitive and efficient system that aligns with the diverse needs and challenges faced in personal finance management. The ultimate goal is to bridge the gap between conventional budgeting methods and an advanced, user-centric system, ensuring individuals can seamlessly track expenses and manage budgets for a more informed and disciplined financial future.

1.6 Objectives of the Research

1.6.1 Main Objective of the Research

To develop a personal finance expense tracking and budget management system.

1.6.2 Specific Objectives of the Research

i. To develop a system for recording daily expenses efficiently.
ii. To design a dashboard that provides a clear overview of users' financial status.
iii. To develop a goal-setting feature that helps users to focus on their financial objectives.
iv. To allow users to customize expense categories for individual financial tracking.
v. To generate personalized financial reports based on user-entered expenses.

1.7 Justification of the Research

In response to the evolving landscape of personal finance, this research is grounded in existing studies that highlight the need for innovative solutions in expense tracking and budget management. Previous research by (Tufano P. , 2009) has shown the importance of effective budgeting for financial well-being, while studies by (Sunstein, 2008)have emphasized the role of behavioral economics in designing user-friendly financial tools.

This research aims to address these insights by developing a Personal Finance Expense Tracking and Budget Management System that caters to individual users' needs and promotes financial inclusivity. By incorporating insights from studies on financial behavior (T O'Donoghue, Doing

it now or later, 1999) and technology adoption (Viswanath Venkatesh, 2003), I seek to create a dynamic and responsive system that empowers users to manage their finances effectively.

Furthermore, the focus on financial inclusivity is supported by research indicating the importance of accessible financial services, especially in regions with a high reliance on cash transactions and mobile payments (Klapper, 2018). By leveraging insights from existing research, this research contributes to individual financial well-being, societal inclusivity, and global advancements in leveraging technology for informed financial futures.

Overall, this research is not just a response to existing gaps but a proactive initiative informed by a thorough review of relevant literature. By leveraging insights from existing research, I aim to contribute to individual financial well-being, societal inclusivity, and global advancements in leveraging technology for informed financial futures.

1.8 Scope of Research

The research scope encompasses the development and implementation of a Personal Finance Expense Tracking and Budget Management System tailored for young adults and individuals in Kenya. The study will focus on understanding the specific financial challenges faced by this demographic, with a keen emphasis on accommodating diverse payment methods prevalent in the region, including cash transactions, M-Pesa, Visa, and major banks. The scope also extends to providing real-time insights and personalized recommendations to foster financial discipline among users. The geographical scope will be limited to Kenya, and the temporal scope will cover the development, testing, and refinement phases of the system. The target population includes young adults and individuals seeking an inclusive and user-friendly tool to enhance their personal finance management practices.

Features to be implemented in this system are;

The system will allow users to track and categorize their expenses comprehensively. Provide users with real-time insights into their financial activities and spending patterns. Offer personalized budget recommendations based on individual financial behaviors. Design an intuitive and user-friendly interface to cater to users with varying levels of financial literacy. Implement robust security measures to ensure the safety and privacy of user data.

By defining this scope, the research aims to develop a system that addresses specific challenges faced by young adults in Kenya, promoting financial inclusivity and empowerment. The targeted features align with the needs of the demographic and contribute to the overall objectives of the study.

1.9 Research Organization

This project documentation will be organized in seven chapters. The first chapter is an introduction that provides insight to the topic being researched. It entails the problem statement, aim of the research, objectives, justification and the scope of the research the second chapter is the research methodology and it will focus on literature review methodology as well as data collection and analysis techniques. The third chapter is a review and comparison of some related work. It comprises of the history of the research topic, review of related systems, patterns in the research area, emerging trends and research gap that is to be filled by the research.

CHAPTER TWO: LITERATURE REVIEW

2.1 Chapter Introduction

This chapter covers the methodology of literature review, history of the research topic, review of related prototypes, systems, emerging trends and patterns in the research area and research gap.

2.2 Methodology for Literature Review

The methodology for the literature review was meticulously crafted to ensure alignment with the objectives and problem statement of the research project, which aimed to develop a nearly perfect system for personal finance expense tracking and budget management. The purpose of the literature review was to identify existing research that could inform the development of useful guidance for this endeavor.

To achieve this, a systematic literature review approach was chosen due to its robustness in synthesizing and analyzing a wide range of existing research. This approach is highly regarded for its ability to comprehensively explore a research area, identify trends and patterns, and generate evidence-based insights. Given the complexity and multidisciplinary nature of the research topic, a systematic approach was deemed most suitable for ensuring thoroughness and rigor in the review process.

The first step involved conducting a comprehensive search across various academic databases, journals, and online repositories. This search was guided by specific keywords and terms related to personal finance management systems, expense tracking, dashboard design, goal-setting features, and user-centric design principles. By casting a wide net, we aimed to capture a diverse range of studies and publications relevant to the research topic.

Publications were meticulously selected based on their relevance to the research objectives and their potential contribution to addressing the identified problem statement. Priority was given to studies that offered insights into key aspects of personal finance management, such as efficient expense recording systems, effective dashboard designs, and the impact of goal-setting features on financial behaviors. Only peer-reviewed and reputable sources were considered to ensure the credibility and validity of the findings.

Upon identifying relevant literature, a systematic process of data extraction was employed to capture key findings, methodologies, and theoretical frameworks used in the selected studies. This involved meticulously documenting pertinent information such as research methods, sample characteristics, data analysis techniques, and key findings. Subsequently, a rigorous thematic analysis approach was employed to categorize and synthesize the extracted data, identifying common themes, trends, and patterns across the literature.

The final step in the systematic literature review involved critically evaluating the selected literature to assess the quality of research methods employed, the validity of findings, and the relevance of theoretical frameworks to the research context. This critical appraisal ensured that only high-quality and credible sources were included in the review, thereby enhancing the reliability and validity of the synthesized finding

By meticulously following this systematic methodology, the literature review provided a comprehensive and nuanced understanding of the existing research landscape in the field of personal finance expense tracking and budget management systems. It informed the development of a robust and evidence-based approach to designing a nearly perfect system that addressed the identified objectives and problem statement. The systematic approach adopted in the literature review underscored the rigor and credibility of the research conducted, thus instilling confidence in the validity of the findings and recommendations generated.

2.3 History of the Research Topic

In an era marked by unprecedented access to financial resources and the proliferation of consumer goods, the need for effective personal finance management has become increasingly paramount. Amidst this backdrop, the development of personal finance expense tracking and budget management systems has emerged as a critical area of research and innovation. This paper aims to delve into the historical trajectory of this research topic, contextualizing its significance within the broader literature on personal finance management.

The roots of personal finance management can be traced back centuries, evolving in tandem with shifts in economic systems and societal norms. Historically, individuals relied on rudimentary methods such as ledger books and mental accounting to track expenses and manage budgets.

However, with the advent of digital technology, particularly in the late 20th and early 21st centuries, a paradigm shift occurred in the landscape of personal finance management (Lohan, 2013).

2.4 Review of Related Prototypes, Systems

2.4.1 Case 1: Mint

Mint is a globally recognized personal finance management system that offers comprehensive expense tracking and budget management features. It allows users to aggregate financial accounts from various institutions, categorize transactions, set budget goals, and receive personalized financial insights. Mint leverages data analytics to provide users with actionable recommendations for optimizing their finances. It operates primarily as a web-based platform but also offers mobile apps for on-the-go access. Mint was conceptualized by Aaron Patzer, who identified a need for a comprehensive personal finance management system. A team of developers was assembled to design and build the platform, focusing on user-friendly interfaces and robust data analytics. Extensive testing was conducted to ensure the platform's functionality, security, and compatibility with various financial institutions. Mint was launched to the public in 2006, initially gaining traction through word-of-mouth marketing and online promotion. Following its acquisition by Intuit in 2009, Mint expanded its user base and introduced new features to enhance its capabilities. Ongoing research and user feedback have informed updates and improvements to Mint.com, optimizing its effectiveness in personal finance management.

Documentation (Mint.com).

2.4.2 Case 2: 22Seven

22Seven is a personal finance management system operating primarily in South Africa but with users across the African continent. It offers features similar to Mint, including account aggregation, expense categorization, budgeting tools, and financial insights. One unique aspect of 22Seven is its integration with South African banking systems, providing users with localized financial data and services tailored to the African market. 22Seven was developed by Old Mutual, a financial services company, in response to the growing demand for personal finance management tools in South Africa. Extensive market research was conducted to understand user

needs and preferences in the South African financial landscape. A team of developers worked to create the 22Seven platform, focusing on customization for the South African market and integration with local banking systems. The platform underwent pilot testing to gather feedback from users and refine its features and functionalities. 22Seven was officially launched in 2012, initially targeting South African users but later expanding its reach across the African continent. Evaluation and research have been conducted to assess the platform's impact on financial literacy and behavior among users in Africa.

Documentation (22Seven)

2.4.3 Case 3: M-PESA

M-PESA is a mobile-based financial service widely used in Kenya for various transactions, including expense tracking and budget management. While not a dedicated personal finance management system like Mint.com or 22Seven, M-PESA offers functionalities such as mobile money transfers, bill payments, and savings accounts. Users can leverage M-PESA's transaction history and account balance features to monitor expenses and manage budgets directly from their mobile phones. M-PESA was developed by Safaricom, Kenya's leading telecommunications company, in collaboration with Vodafone, as a response to the need for a mobile money transfer service. Safaricom's team of engineers and developers worked to create the technology infrastructure necessary for mobile money transfers, including secure transaction protocols and user interfaces. Safaricom obtained regulatory approval from the Central Bank of Kenya for the launch of M-PESA, ensuring compliance with financial regulations and security standards. M-PESA underwent a pilot phase to test its functionality and usability among a select group of users before its official launch. M-PESA was officially launched in 2007, initially offering basic mobile money transfer services but later expanding to include additional features like bill payments and savings accounts. Safaricom continued to enhance and expand M-PESA's capabilities, introducing new services and partnerships to meet the evolving needs of users in Kenya and beyond.

Documentation (Safaricom)

2.4.4 Case 4: YNAB (You Need A Budget)

YNAB is a popular budgeting tool designed to help users achieve financial clarity and control. It encourages users to assign every dollar a job, emphasizing proactive budgeting and financial awareness. YNAB operates as a web application with mobile app support, offering synchronization across devices for convenience. Its features include:

Proactive Budgeting: Users allocate their income to various budget categories, prioritizing needs and goals.

Goal Tracking: It provides tools for setting financial goals, such as saving for emergencies or paying off debt, and tracks progress visually.

Financial Insights: YNAB uses analytics to offer insights into spending habits and trends.

Bank Synchronization: Users can link their bank accounts for automatic transaction importing.

Educational Resources: YNAB offers budgeting tutorials, workshops, and blogs to improve financial literacy.

YNAB was developed by Jesse Mecham in 2004 as a solution to personal budgeting challenges. The system focuses on a unique four-rule methodology: giving every dollar a job, embracing true expenses, rolling with the punches (adjusting budgets as needed), and aging money (spending last month's income). Regular updates and user feedback have kept YNAB relevant and effective.

Documentation: YNAB.com

2.4.5 Case 5: PocketGuard

PocketGuard is a personal finance app designed to simplify expense tracking and budgeting by showing users how much money is "safe to spend." It operates primarily as a mobile application but also provides web access for account management. Its features include:

Safe-to-Spend: Calculates disposable income after accounting for bills, goals, and necessities.

Account Aggregation: Integrates multiple accounts to provide a complete financial overview.

Expense Categorization: Automatically categorizes spending and identifies opportunities to save.

Bill Reminders: Tracks due dates for bills and sends reminders to avoid late payments.

Savings Goals: Enables users to set and track savings goals within their budgets.

PocketGuard was created by Igor Kuznetsov in 2014 to help users gain control over their spending habits. The app employs advanced encryption for data security and works with financial institutions to ensure seamless integration. It relies on user data and feedback to refine its algorithms and user interface.

Documentation: PocketGuard.com

2.5 Emerging Trends and Patterns

Emerging Trends in Personal Finance Expense Tracking and Budget Management Systems

In recent years, the landscape of personal finance management has witnessed several emerging trends that are shaping the development and adoption of expense tracking and budget management systems. These trends reflect evolving consumer needs, technological advancements, and shifts in financial behaviors (Petrov, 2024).

Integration of AI and Machine Learning

One of the most significant trends is the integration of artificial intelligence (AI) and machine learning (ML) algorithms into personal finance management systems. AI-powered features, such as automated expense categorization and predictive analytics, provide users with personalized insights and recommendations for budget optimization (Jones, 2020). These systems analyze user spending patterns, predict future expenses, and offer proactive financial advice, enhancing the effectiveness and efficiency of budget management (Silver, The Impact of AI on Personal Finance Management., 2019)

Mobile-First Solutions

With the widespread adoption of smartphones and mobile devices, there's a growing emphasis on mobile-first personal finance management solutions. Mobile apps offer users real-time access to

their financial data, allowing them to track expenses, set budgets, and make informed financial decisions on the go (Ćebić, 2023). Researchers and developers focus on optimizing mobile app interfaces, enhancing performance, and integrating mobile-specific features to cater to the needs of mobile-centric users (O'Connor, The Rise of Mobile-First Financial Solutions., 2020)

Personalization and Customization

Users increasingly demand personalized finance management solutions tailored to their individual needs and preferences. Personalization features, such as customizable budget categories, goal-based saving plans, and personalized financial insights, enhance user engagement and satisfaction (Bhatia, 2019). Researchers explore ways to leverage user data and machine learning algorithms to provide personalized recommendations and guidance, empowering users to achieve their financial goals more effectively.

Block chain and Crypto currency Integration

The rise of block chain technology and crypto currencies has sparked interest in integrating them into personal finance management systems. Block chain offers benefits such as enhanced security, transparency, and decentralized asset management. Researchers explore applications in areas like secure digital identity verification, smart contract-based budgeting, and crypto currency portfolio management within personal finance management systems (Nakamoto, 2008) (Swan, 2015).

Behavioral Economics Insights

Drawing from insights in behavioral economics, personal finance management systems are designed to nudge users towards responsible financial behaviors. Principles such as social proof, loss aversion, and gamification are integrated into these systems to encourage savings, prudent spending habits, and adherence to budgeting goals (Thaler S. , 2008). Incorporating behavioral economics principles enhances user engagement and improves financial outcomes (Mullainathan, 2013)

Open Banking and Data Aggregation

Open banking initiatives and data aggregation technologies facilitate secure data sharing among financial institutions and personal finance management systems. Application Programming Interfaces (APIs) and data aggregation tools enable seamless integration of financial data, providing users with a holistic view of their finances (Khraisha, 2024). Researchers explore ways to leverage open banking frameworks to enhance interoperability, data analytics, and user experiences in personal finance management systems (Apptopia, 2020).

In addition to emerging trends, certain patterns have emerged in the realm of personal finance expense tracking and budget management systems. These patterns provide valuable insights into recurring themes and behaviors observed within the field, guiding researchers and practitioners in designing effective solutions.

User-Centric Design

A prominent pattern observed in personal finance management systems is the focus on user-centric design principles. Developers prioritize creating interfaces that are intuitive, visually appealing, and easy to navigate. User feedback and usability testing play a crucial role in shaping the design process, ensuring that systems meet the needs and preferences of diverse user demographics (Norman, 2013).

Data Security and Privacy

Data security and privacy are recurring patterns in personal finance management systems. Given the sensitivity of financial information, users expect robust security measures to protect their data from unauthorized access and breaches. Developers implement encryption, multi-factor authentication, and data anonymization techniques to safeguard user information and maintain user trust (Schneier, 2015).

Financial Education and Literacy

Personal finance management systems often incorporate features aimed at promoting financial education and literacy among users. These features may include educational articles, tutorials, and interactive tools designed to improve users' understanding of financial concepts, budgeting

strategies, and investment principles. By empowering users with knowledge, these systems facilitate informed financial decision-making (Remund, 2010).

Continuous Improvement and Iteration

A recurring pattern observed in personal finance management systems is the commitment to continuous improvement and iteration. Developers regularly update and enhance system functionalities based on user feedback, technological advancements, and market trends. This iterative approach ensures that systems remain relevant, responsive, and capable of meeting evolving user needs (Cagan, 2017).

Interoperability and Integration

Personal finance management systems often exhibit patterns of interoperability and integration with external financial services and platforms. Developers leverage Application Programming Interfaces (APIs) and data exchange standards to enable seamless integration with banking institutions, investment platforms, and third-party financial apps. This interoperability enhances the utility and value proposition of these systems by providing users with access to comprehensive financial data and services (Mudambi, 2021).

Goal Setting and Tracking

Many personal finance management systems facilitate goal setting and tracking, allowing users to set financial goals, track progress, and adjust strategies over time. These systems may include features such as goal visualization tools, progress trackers, and reminders to help users stay on track and motivated towards achieving their financial objectives (Stanley T. J., 1996).

Behavioral Insights and Nudging

Personal finance management systems often leverage insights from behavioral economics to encourage positive financial behaviors among users. These systems may incorporate nudges, prompts, and incentives designed to steer users towards prudent spending, saving, and budgeting habits. By leveraging behavioral insights, these systems enhance user engagement and promote long-term financial well-being (Thaler S. , Improving Decisions About Health, Wealth, and Happiness. Penguin Books, 2008).

2.6 Research Gap

In the realm of personal finance expense tracking and budget management systems, while there exists a substantial body of literature exploring various aspects of these systems, a critical examination reveals a notable research gap that warrants further investigation. The identified research gap pertains to the under-explored intersection of user-centric design principles and financial literacy education within personal finance management systems.

Existing literature primarily focuses on the technical functionalities and features of personal finance management systems, such as AI and machine learning algorithms, mobile-first solutions, and behavioral economics principles. However, there is a scarcity of research that delves into the incorporation of user-centric design principles and financial literacy education strategies within these systems.

A comprehensive review of the literature reveals numerous publications examining various aspects of personal finance management systems. These include studies evaluating the impact of AI and machine learning algorithms on financial decision-making, investigations into the role of mobile-first solutions in enhancing user accessibility and engagement, and analyses of the effectiveness of behavioral economics principles in promoting responsible financial behaviors.

The research gap encompasses the need to explore how integrating user-centric design principles, such as intuitive interfaces, personalized user experiences, and accessibility features, can enhance the usability and effectiveness of personal finance management systems. Additionally, there is a lack of understanding regarding the impact of integrating financial literacy education components, such as educational resources, tutorials, and personalized guidance, on users' financial knowledge, behaviors, and outcomes within these systems.

Moreover, while some studies have examined the effectiveness of standalone financial literacy education programs or interventions, few have investigated how seamlessly integrating such education within personal finance management systems can enhance user engagement and financial decision-making.

Addressing this research gap is crucial as it has implications for improving user engagement, promoting financial literacy, and ultimately empowering individuals to make informed financial

decisions and achieve their financial goals. By bridging this gap, researchers can contribute to the development of more effective and user-friendly personal finance expense tracking and budget management systems that cater to the diverse needs and preferences of users.

Hence, the identified research gap revolves around the under-explored integration of user-centric design principles and financial literacy education within personal finance management systems. This gap represents an opportunity for further research to enhance the usability, effectiveness, and impact of these systems on users' financial well-being.

2.7 Chapter Summary

This chapter commences with an introduction to the research topic, delivering to readers an overview of the subsequent discussions. Following this, the history of the research topic is explored, tracing its evolution and significance within the field of personal finance expense tracking and budget management systems.

A review of related prototypes and systems is then presented, spanning from global, international and local contexts. This comprehensive analysis offers insights into existing solutions and their implications for the development of innovative approaches. These systems, with their widespread adoption and integration of advanced technologies like machine learning and data analytics, offer valuable insights into industry best practices and user expectations.

Emerging trends and patterns in the research area are discussed, highlighting the dynamic nature of personal finance management systems and the evolving needs of users. These trends underscore the importance of staying abreast of technological advancements and user preferences in designing effective solutions. These technologies empower users with personalized insights, automated budgeting suggestions, and predictive analytics, enhancing decision-making capabilities and fostering proactive financial habits.

The chapter also identifies a research gap within the literature, emphasizing the need for further exploration of the integration of user-centric design principles and financial literacy education within personal finance management systems. This gap represents an opportunity for future research to enhance the usability and effectiveness of these systems.

Therefore, the chapter provides a comprehensive overview of the research topic, contextualizing it within historical developments, reviewing existing prototypes and systems, analyzing emerging trend and patterns, and identifying a critical research gap. This sets the stage for the subsequent chapters, which will delve deeper into specific aspects of the research topic and contribute to advancing knowledge in the field. This chapter summary highlights the significance of addressing the research gap and the potential impact of future studies in advancing knowledge and promoting financial well-being.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter explicates the research methodology with respect to the study and development of the Personal Finance Expense Tracking and Budget Management System, the process, methods, and technologies to be used in solving the problem and meeting the objectives put in place. Additionally, system testing and deployment methodologies have been described. The methodology will be performed following the best practices in order for it to meet the users' needs effectively.

3.2 Methodology for Requirement Specification, Data Collection, and Analysis Techniques

3.2.1 Requirements Specification

Requirements will be elicited from stakeholders, including Nairobi residents, financial institutions, and community organizations, through interviews. More data will be acquired through surveys, questionnaires, and observations to get a deeper understanding of the users' needs. Each requirement will be given a priority score based on factors such as reach, impact, confidence, and effort using a structured framework that will make the requirements clear and complete. This iterative process will refine the requirements and align them with the needs of the stakeholders.

3.2.2 Data Collection Methods

3.2.2.1 Surveys

Online surveys will be issued targeting Nairobi residents to source information on financial practices, challenges, and preferences among these people. The survey will comprise open-ended and closed-ended questions to capture both qualitative and quantitative data with regard to methods of tracking expenses, practices related to budgeting and the ideal features in a personal finance system.

3.2.2.2 Interviews

Semi-structured interviews will be conducted across the socio-economic divide to explore financial experiences, existing tools, and expectations. This approach allows flexibility for in-depth discussions and follow-up inquiries.

3.2.2.3 Observation

The observation of financial behavior in natural settings, like markets, shops, and universities, will give first-hand insights into how Nairobi residents currently manage their expenses and budgets. This will involve observations of interactions with existing tools and the areas that need improvement or innovation..

3.2.2.4 Secondary Data Analysis

The research will use existing sources such as financial reports, market research, and educational studies to understand broader trends and behaviors. Descriptive statistics of mean, median and frequency will be used to summarize and compare the data effectively.

3.3 Methodology for System Analysis

The SSAD approach has been used for system analysis in order to find inefficiencies in existing personal finance practices. Tools such as Context Diagrams, Data Flow Diagrams (Level 1 and Level 2), and normalization techniques will provide a clear understanding of current workflows and data management.

3.3.1 Context Diagram

The Context Diagram represents key stakeholders and their interactions with the system, including data exchanges and workflows in the current manual processes.

3.3.2 Level 1 and Level 2 DFDs

The Level 1 DFD provides an overview of the processes and data flows, while the Level 2 DFD delves deeper into sub-processes and specific data flows, ensuring a comprehensive analysis.

3.3.3 Normalization

Data will be organized into the 3rd Normal Form to get rid of redundancy and maintain data integrity. This involves separating entities such as expenses, users, and transactions into different tables with clear relationships.

3.4 Methodology for System Design

The system design utilized the SSAD approach, focusing on user-centered design and system efficiency.

3.4.1 Flowcharts

Detailed workflows for expense tracking and budget management were developed to map user interactions and processes.

3.4.2 Database Design

Entity-Relationship Diagrams (ERDs) were used to structure data storage and retrieval, ensuring scalability and efficiency.

3.4.3 User Interface Design

Prototyping tools created wireframes and mockups for an intuitive and user-friendly interface. Accessibility and usability principles guided the design.

3.4.4 Design Artifacts

Design artifacts, including Use Case Diagrams and Pseudo Codes, were used to represent system functionality and logic. Example:

Expense Tracking

Procedure: Record Expense

Input: Expense name, amount, category, date

Output: Updated expense list

Begin

Create a new expense entry

Add the entry to the expense list

Print "Expense recorded successfully."

End

Budget Management

Procedure: Record Budget

Input: Budget amount, category, duration

Output: Updated budget list

Begin

Create a new budget entry

Add the entry to the budget list

Print "Budget recorded successfully."

End

3.5 Methodology for System Implementation

3.5.1 Backend Technologies

Python will be used for backend development due to its wide range in libraries and frameworks for data processing.

3.5.2 Frontend Technologies

HTML, CSS, and JavaScript will be used for the frontend, with PHP used to connect the frontend to the database.

3.5.3 Database Technologies

The database will be created using phpMyAdmin,.

3.6 Methodology for System Testing

3.6.1 Testing Plan

A full-fledged testing plan was designed that included objectives, techniques, criteria, and performance metrics. Testing objectives included functionality, usability, security, and scalability.

3.6.2 Testing Techniques

Unit Testing: Verifies individual components.

Integration Testing: Ensures seamless interactions between modules.

System Testing: Validates overall functionality against requirements.

User Acceptance Testing (UAT): Gathers user feedback on usability and performance.

Performance Testing: Assesses system behavior under varying loads.

3.7 Methodology for System Deployment

3.7.1 Deployment Approach

A phased deployment strategy will be implemented to minimize risks. Initial feedback will be solicited from pilot deployments, followed by incremental rollouts. Tutorials and user training sessions will ensure smooth adoption

3.8 Chapter Summary

This chapter gave a detailed account of the methodologies used for requirements specification, system analysis, design, implementation, testing, and deployment. Each methodology was specifically crafted to meet the particular needs of Nairobi residents in order to make the approach to system development user-centric.

CHAPTER FOUR: SYSTEM ANALYSIS

4.1 Introduction

System analysis involves examining the existing system, identifying challenges, and proposing an improved system. This chapter details the evaluation of the current system, feasibility study, requirements analysis, and system breakdown.

4.2 Description of the Current System

The existing financial tracking system primarily relies on manual entry and basic spreadsheets, leading to inefficiencies such as data redundancy, errors, and lack of real-time tracking. Users face challenges in managing expenses, setting budgets, and generating financial reports. The new system aims to automate financial tracking, improve security, and enhance reporting features.

4.2.1 System Workflow (M-Pesa)

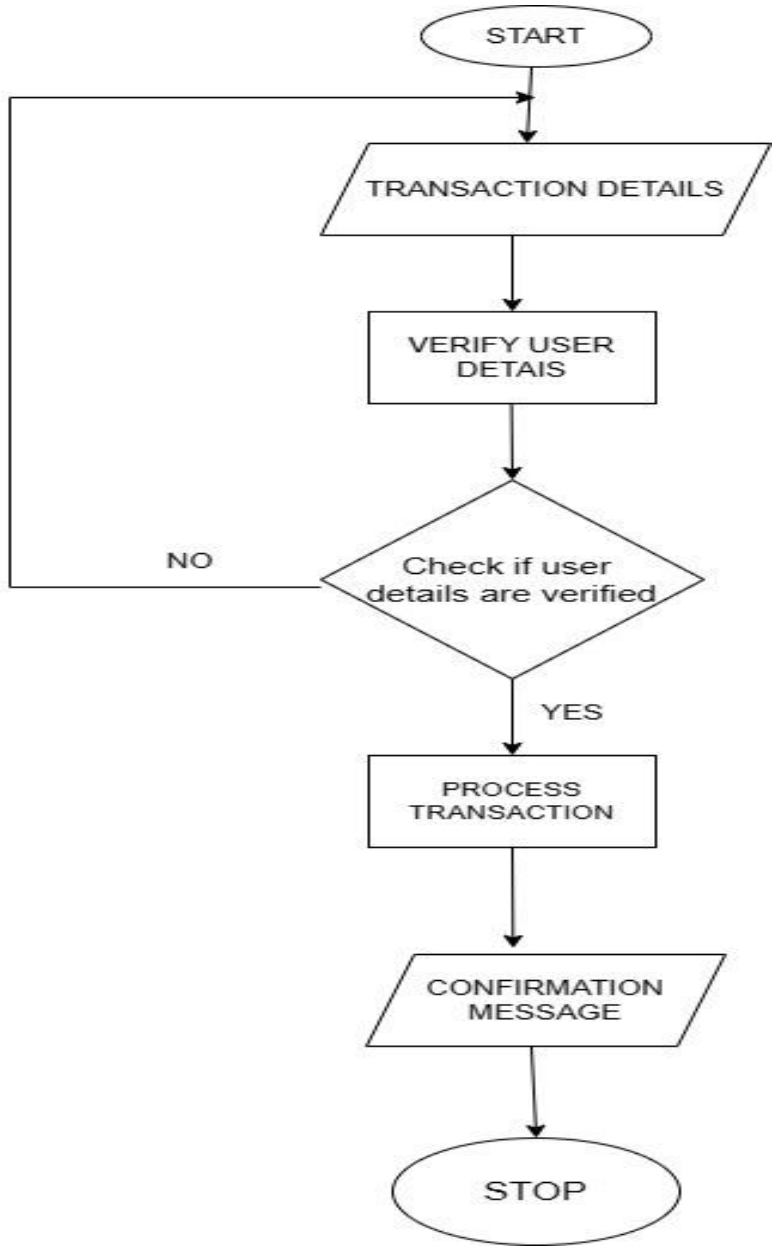


Figure: 1: M-Pesa Flowchart

4.2.2 Current System Strengths

Supports mobile transactions via M-Pesa

Enables digital financial tracking

Provides a familiar system for users already using mobile money.

4.2.3 Current System Weaknesses

No automation for expense categorization

Lacks budget alerts

Limited reporting and visualization capabilities

4.3 Feasibility Study

4.3.1 Operational Feasibility

The proposed system is user-friendly, efficient, and reduces manual errors in financial tracking.

4.3.2 Technical Feasibility

The system will be implemented using PHP, MySQL, and JavaScript, which are widely supported and compatible with various platforms.

4.3.3 Social Feasibility

The system encourages better financial management habits, improving users' savings and budgeting practices.

4.3.4 Economic Feasibility

Development costs are minimal since open-source tools are used. The long-term benefits of improved financial management outweigh the initial investment.

4.4 Requirements Analysis

4.4.1 Functional Requirements

User authentication and profile management

Budgeting and expense tracking

Wallet and transaction management

Savings goal management

Reports and analytics

4.4.2 Non-Functional Requirements

User-friendly interface

Secure authentication and data encryption

Responsive design for different devices

Efficient database queries for performance optimization

4.5 System Analysis

4.5.1 System Workflow

The proposed system follows a streamlined workflow that includes user registration, expense tracking, budget management, and financial reporting. The workflow ensures automated financial tracking, real-time insights, and secure data handling.

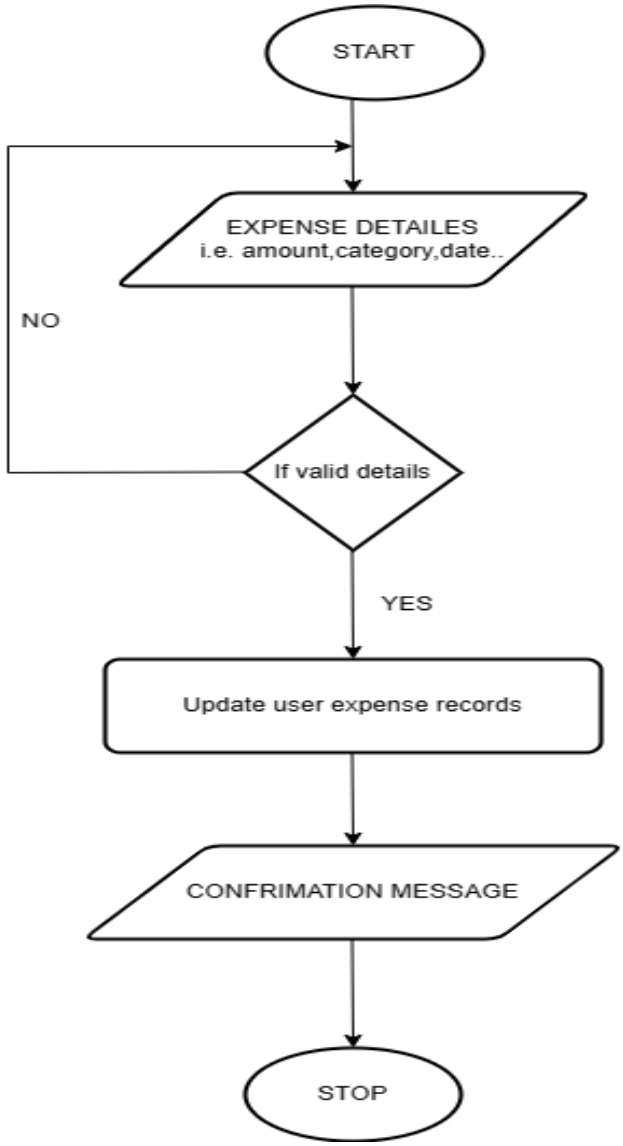


Figure: 2: System Flowchart

4.5.2 Context Diagram

The context diagram provides a high-level view of the system's interactions with external entities, including users and financial institutions.

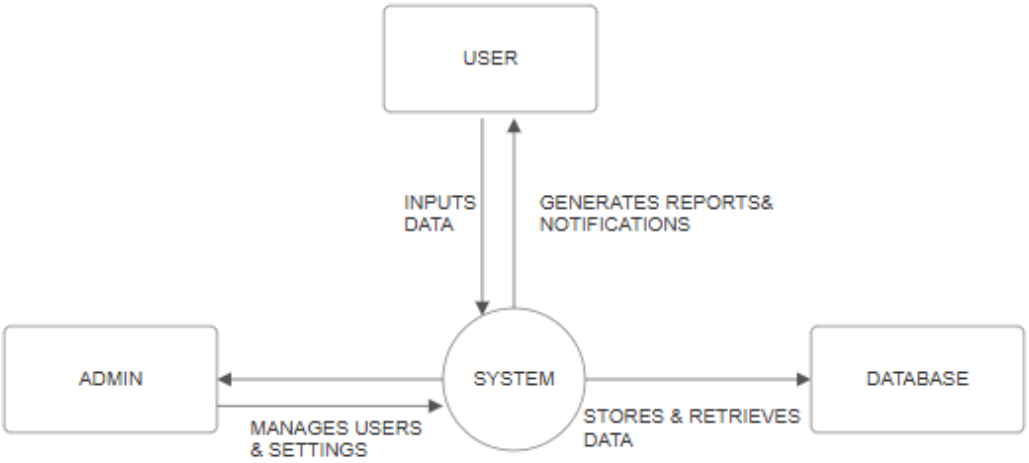


Figure: 3: Context Diagram

4.5.3 DFD (Level 1)

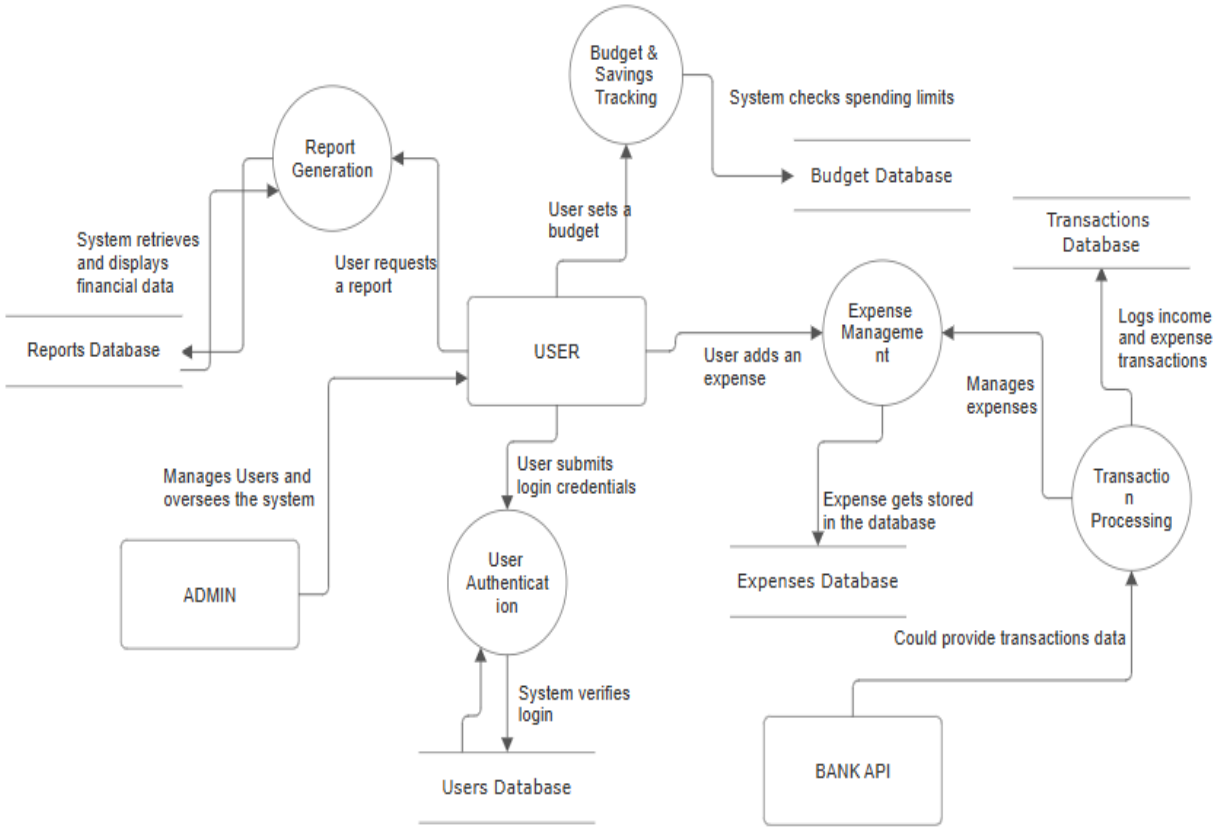


Figure: 4: DFD (LEVEL 1)

4.5.4 DFD (Level 2)

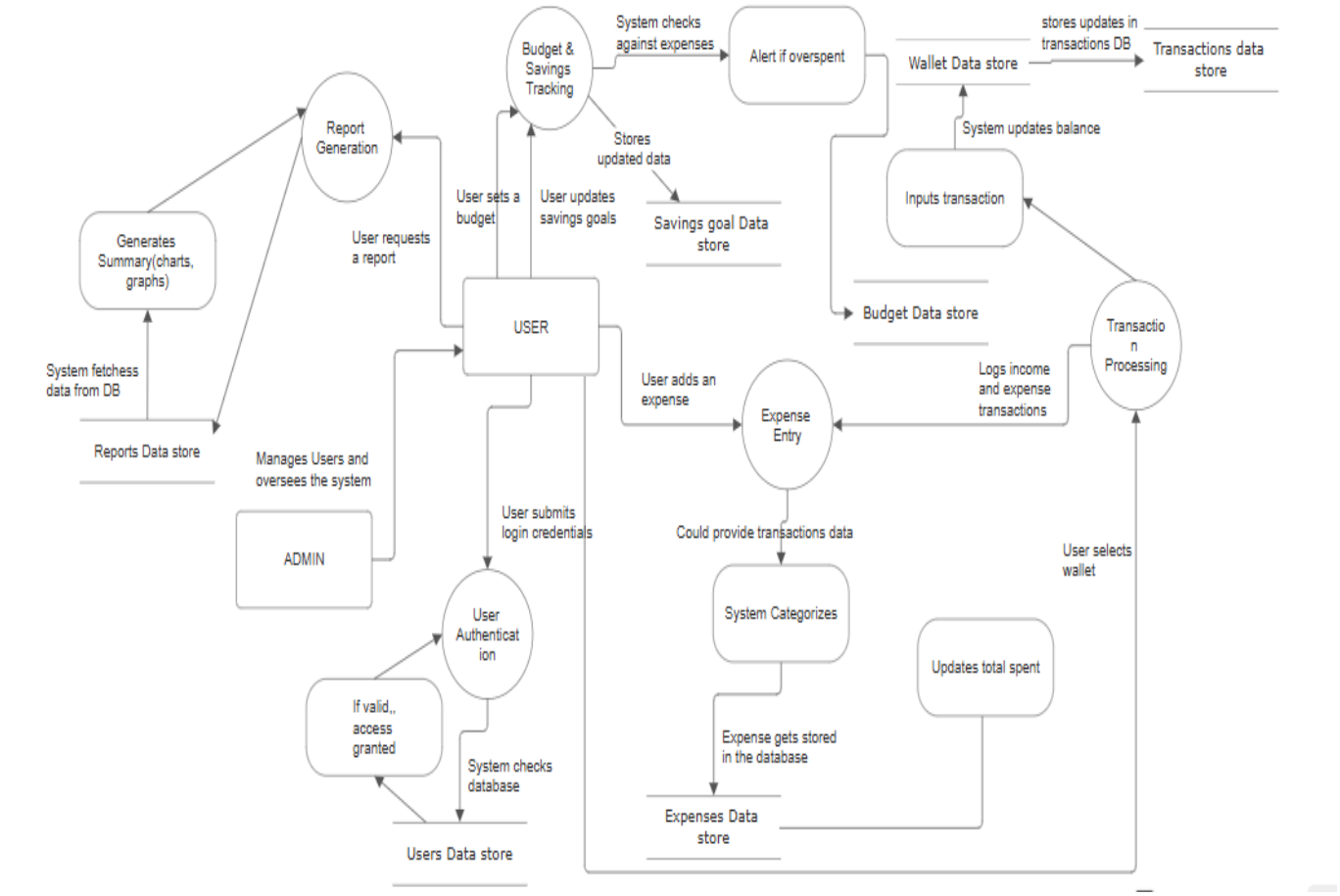


Figure: 5: DFD (LEVEL 2)

4.6 System Users / Actors

Inputs

User registration details

Expense and budget entries

Transaction records

Savings goal information

Outputs

Budget status updates

Expense summaries and reports

Savings goal progress

Wallet balances

4.6.1 Normalization

Data normalization is applied to ensure efficient database storage. The process includes:

1st Normal Form (1NF): Ensures all tables contain unique rows and atomic values.

2nd Normal Form (2NF): Eliminates partial dependencies by ensuring all attributes depend on the primary key.

3rd Normal Form (3NF): Eliminates transitive dependencies by ensuring all non-key attributes depend only on the primary key.

4.9 Chapter Summary

This chapter analyzed the current financial tracking system, identified its weaknesses, and proposed an improved system. Feasibility was assessed, requirements were documented, and

system analysis tools such as DFDs and context diagrams were used to break down the new system's components.

CHAPTER FIVE: SYSTEM DESIGN

5.1 Introduction

This chapter presents the design of the proposed system. The design process follows the requirement specified in Chapter 4 and includes user interface design, process design, database design, and test data. The system is designed using a structured approach to ensure usability, security, and efficiency.

5.2 User Interface Design

The user interface of Penny Pilot is designed for ease of use and accessibility. The design follows modern UI principles to enhance the user experience while maintaining a pink and black aesthetic.

5.2.1 Input Form Design

The system provides user-friendly forms for inputting transactions, expenses, budget settings, and savings goals. The expense form is centered and allows users to add, edit, and delete expenses. The form includes:

Expense Title

Amount

Category (Dropdown with predefined categories)

Date Picker

Description

Save Expense Button

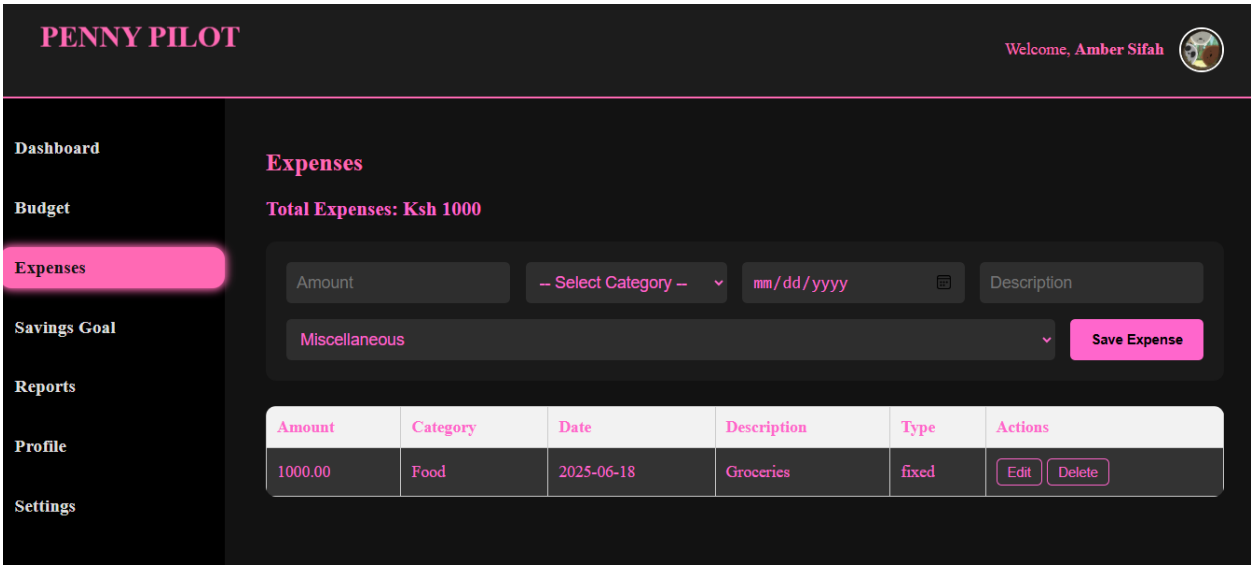


Figure: 6: Input Form

5.2.2 Reports Design

The system includes a Report Page (report.php) that displays financial reports of the following

Budget vs. Actual Spending Report

Purpose: Compares the user's budgeted amount with actual spending.

Filters: Category-based or monthly

Output:

Budgeted amount per category

Actual amount spent per category

Difference (over/under budget)

Graph: Line graph showing budgeted vs. actual spending trend

Income vs. Expense Report

Purpose: Helps users understand if they are overspending or saving money.

Filters: Monthly, yearly

Output:

Total income for the selected period

Total expenses for the selected period

Net balance (Income - Expenses)

Graph: Pie chart showing income vs. expense ratio

Savings Goal Progress Report

Purpose: Tracks how much the user has saved toward each savings goal.

Filters: Goal-based

Output:

Target savings amount

Amount saved so far

Remaining amount to reach the goal

Graph: Progress bar for each savings goal

Transaction History Report

Purpose: Displays all income and expense transactions within a selected timeframe.

Filters: Date range, transaction type (income/expense)

Output:

List of all transactions (date, category, amount, description)

Graph: None (shown as a table with sorting & filtering options)

Expense breakdown by category (Pie Chart)

Expense Summary Report

Purpose: Provides a breakdown of expenses by category within a selected period.

Output:

Total expenses within the period

Amount spent per category (Food, Transport, Rent, etc.)

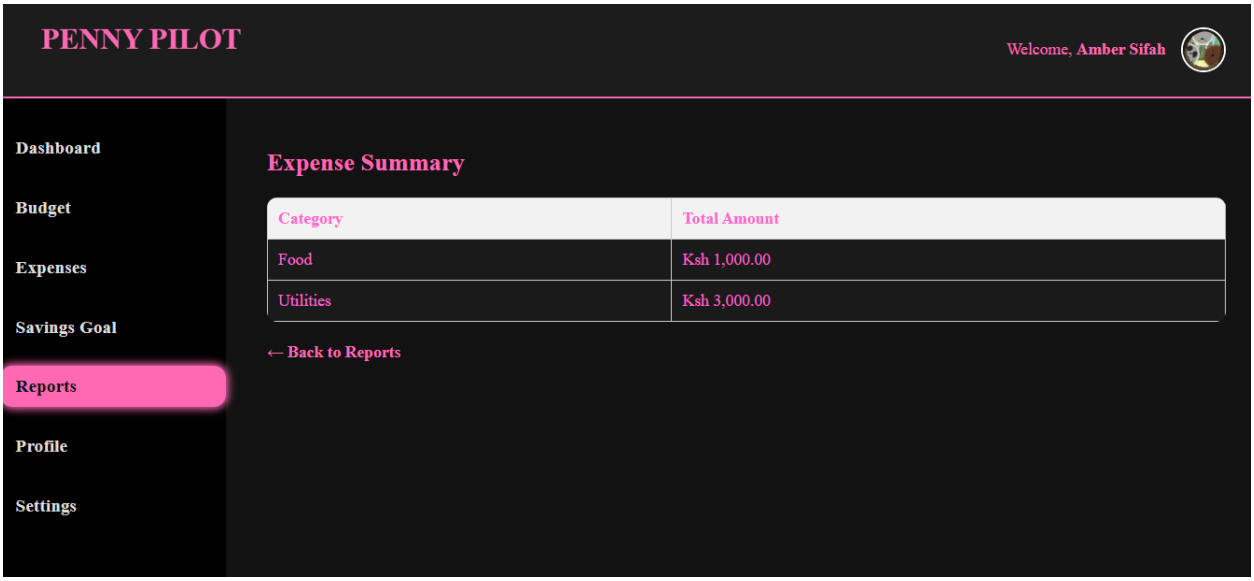


Figure: 7: Report

5.3 Process Design

The process design defines how different components of the system interact. The following sections elaborate on key processes derived from the Data Flow Diagram (DFD).

5.3.1 User Authentication Flowchart

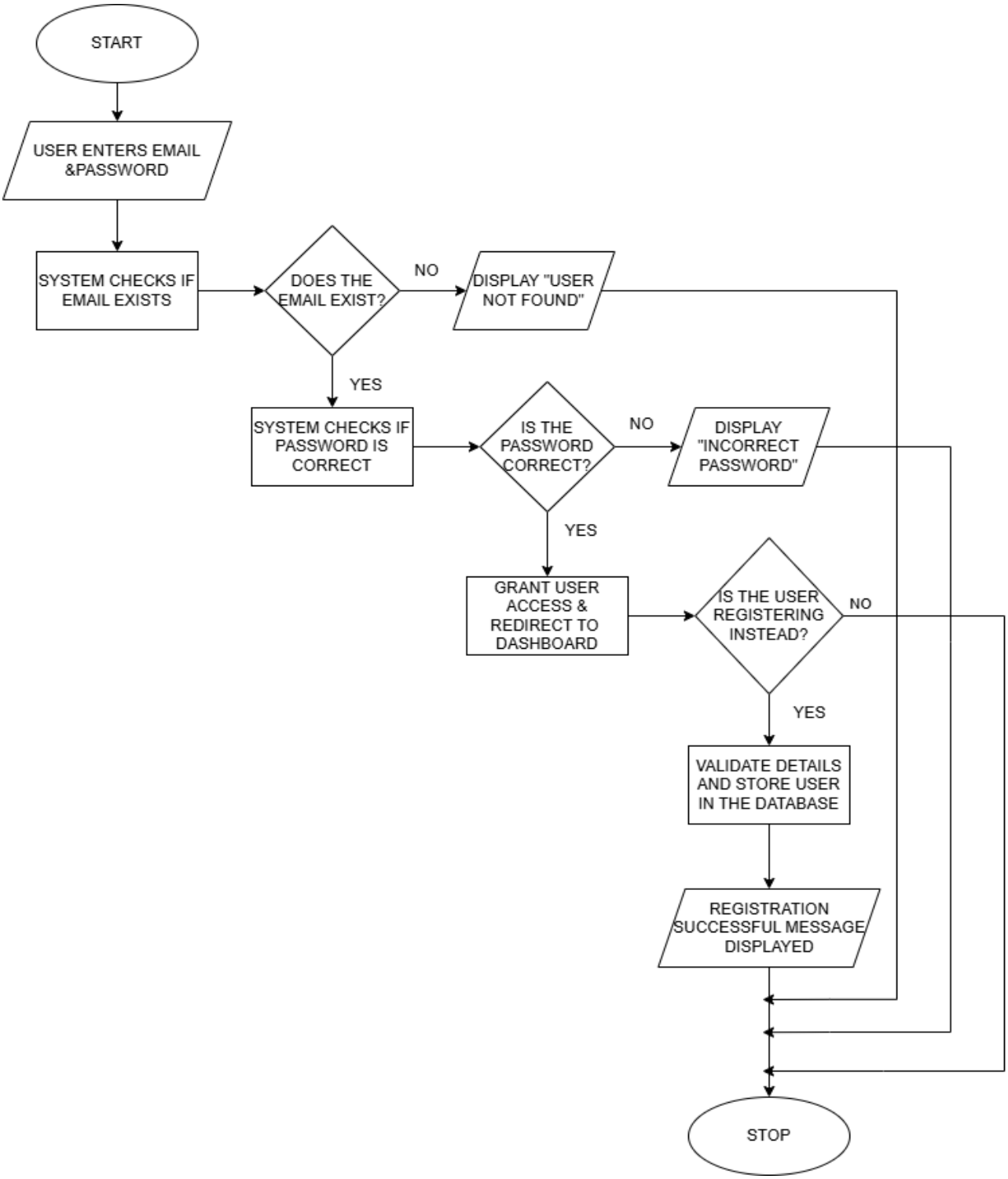


Figure: 8: User Authentication Flowchart

5.3.2 Expense Entry and Budget Verification Flowchart

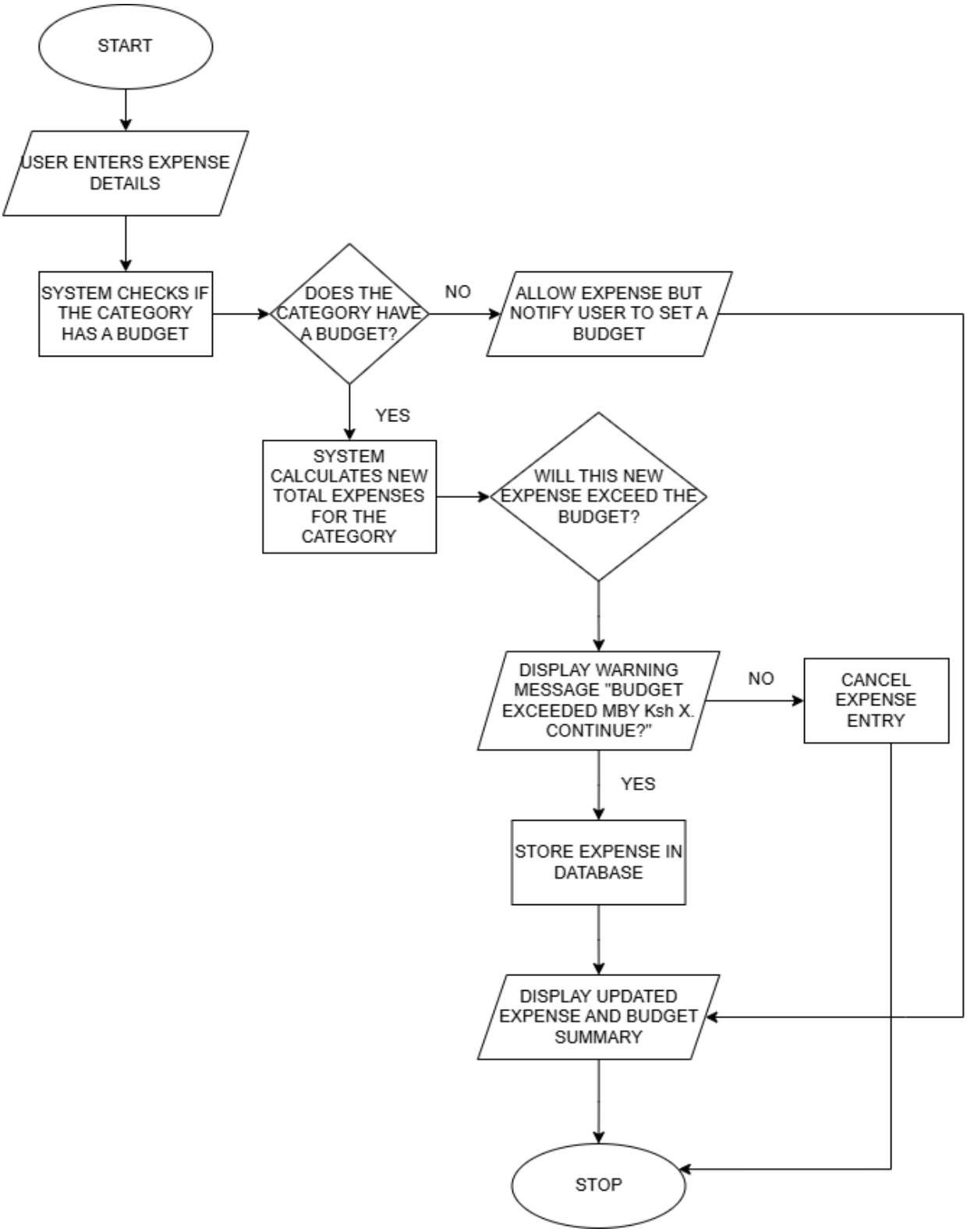


Figure: 9: Expense & Budget Flowchart

5.3.3 Dashboard Access Flowchart

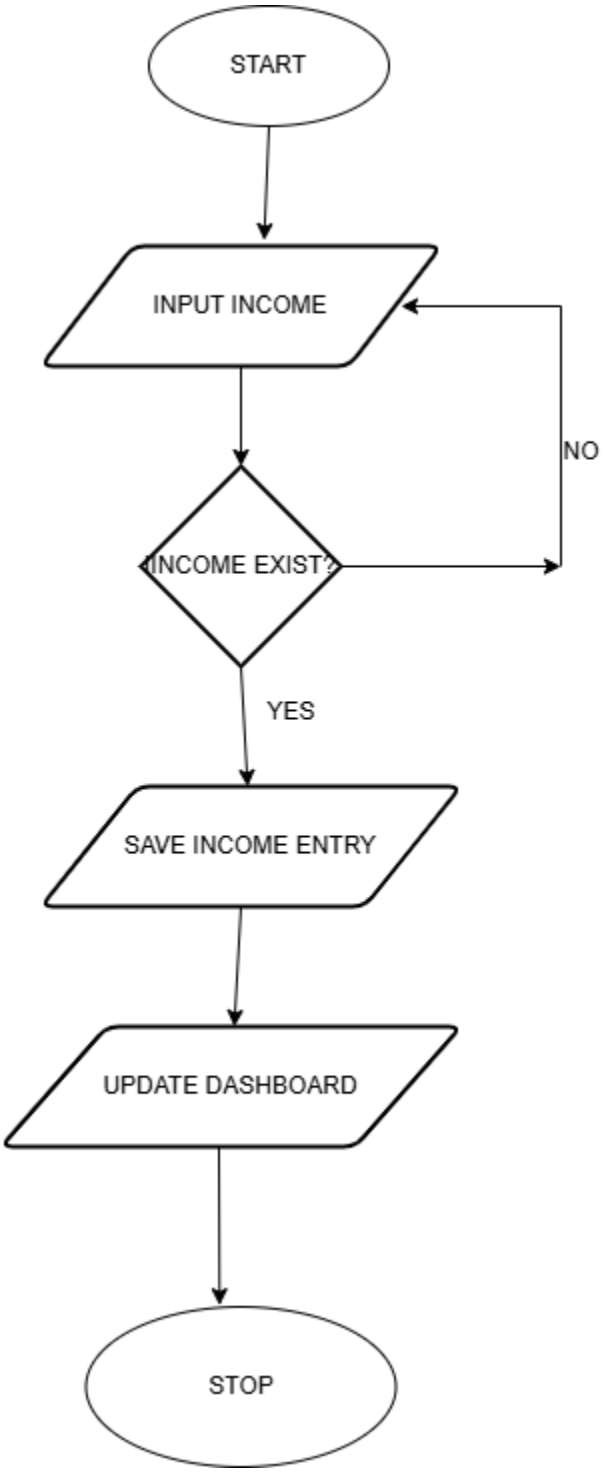


Figure: 10: Dashboard Access Flowchart

5.3.4 Savings Goal Update Flowchart

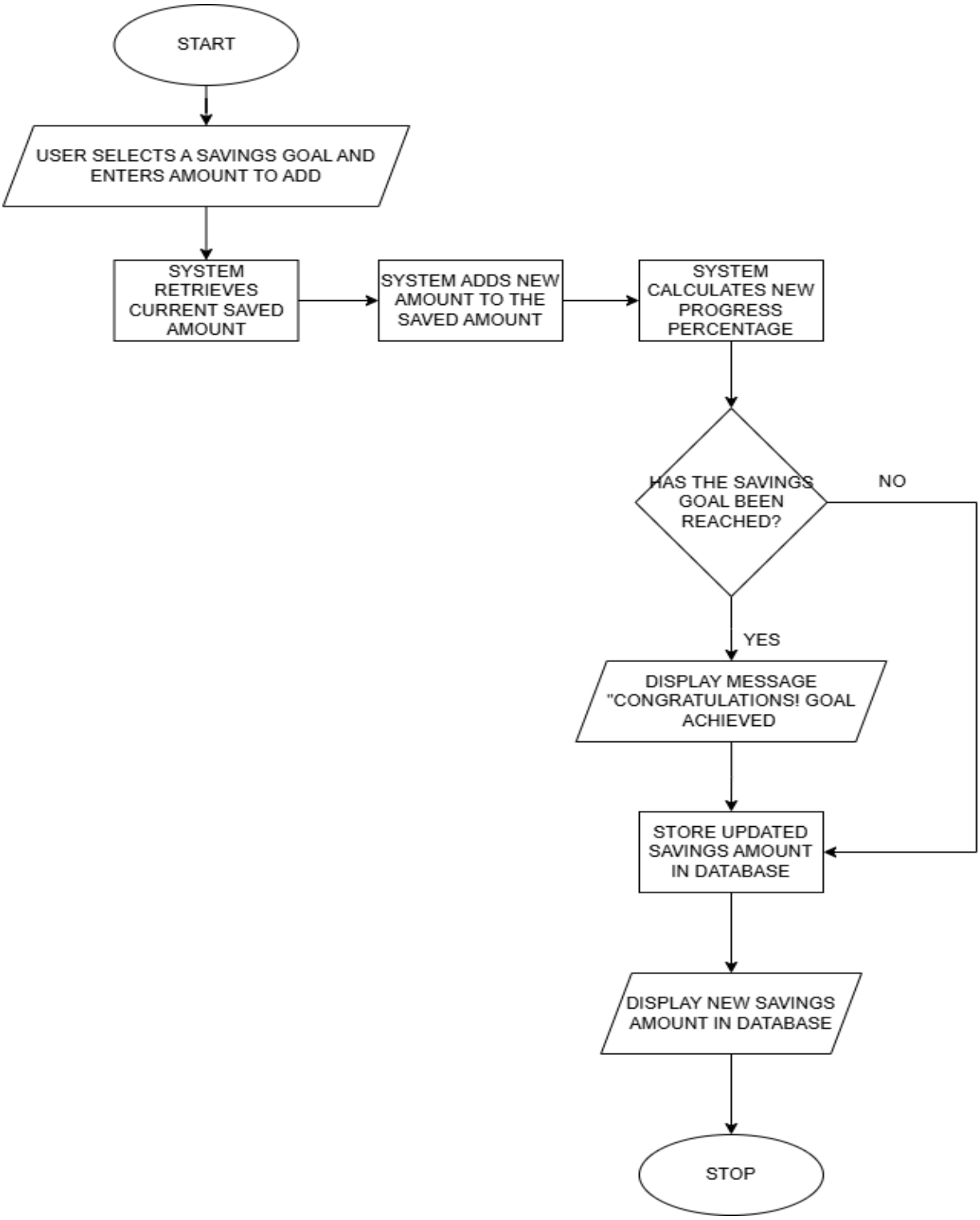


Figure: 11: Savings Goal Update Flowchart

5.3.5 Use case diagram

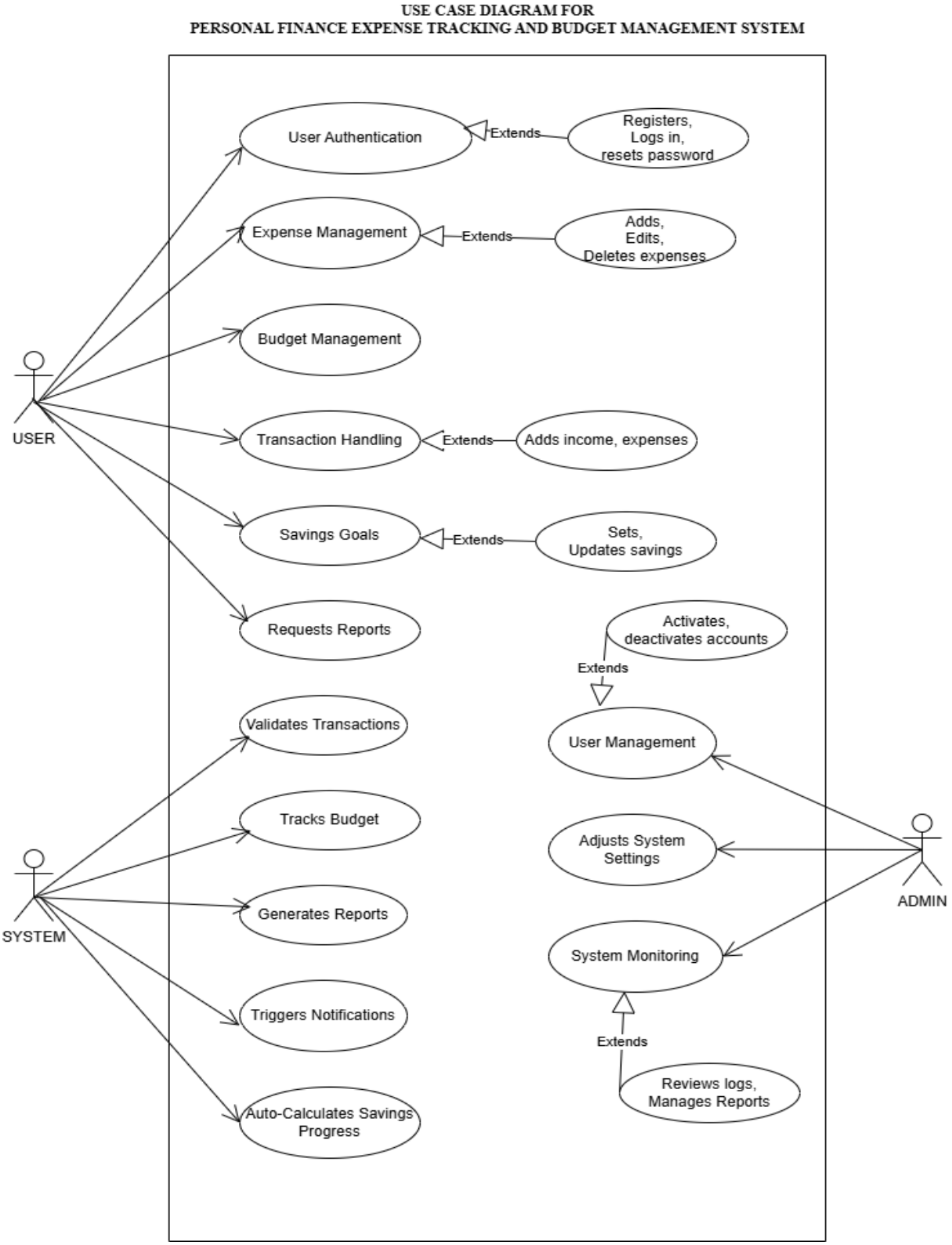


Figure: 12: Use Case Diagram

5.3.6 Sequence Diagram

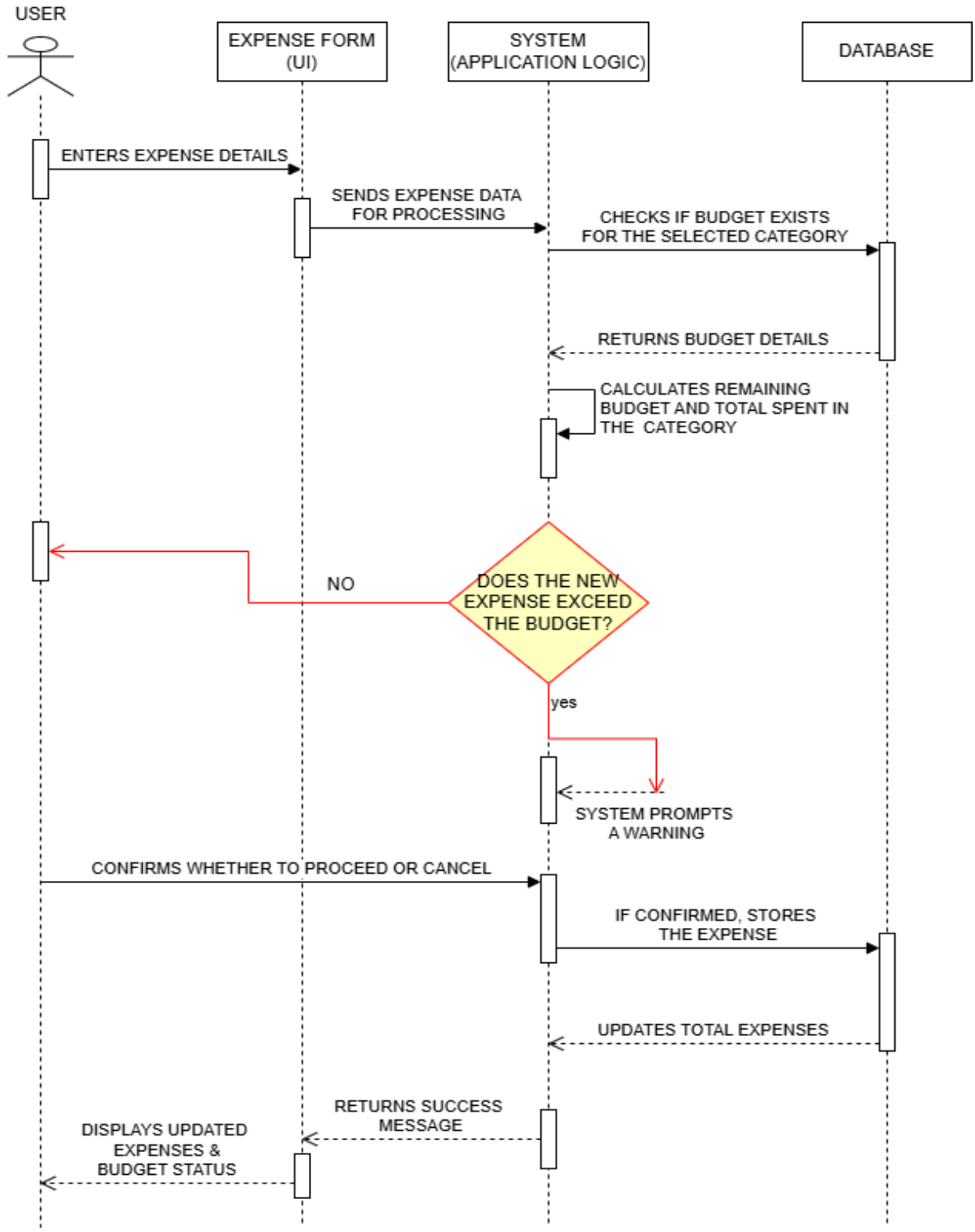


Figure: 13: Sequence Diagram

5.3.7 Class Diagram

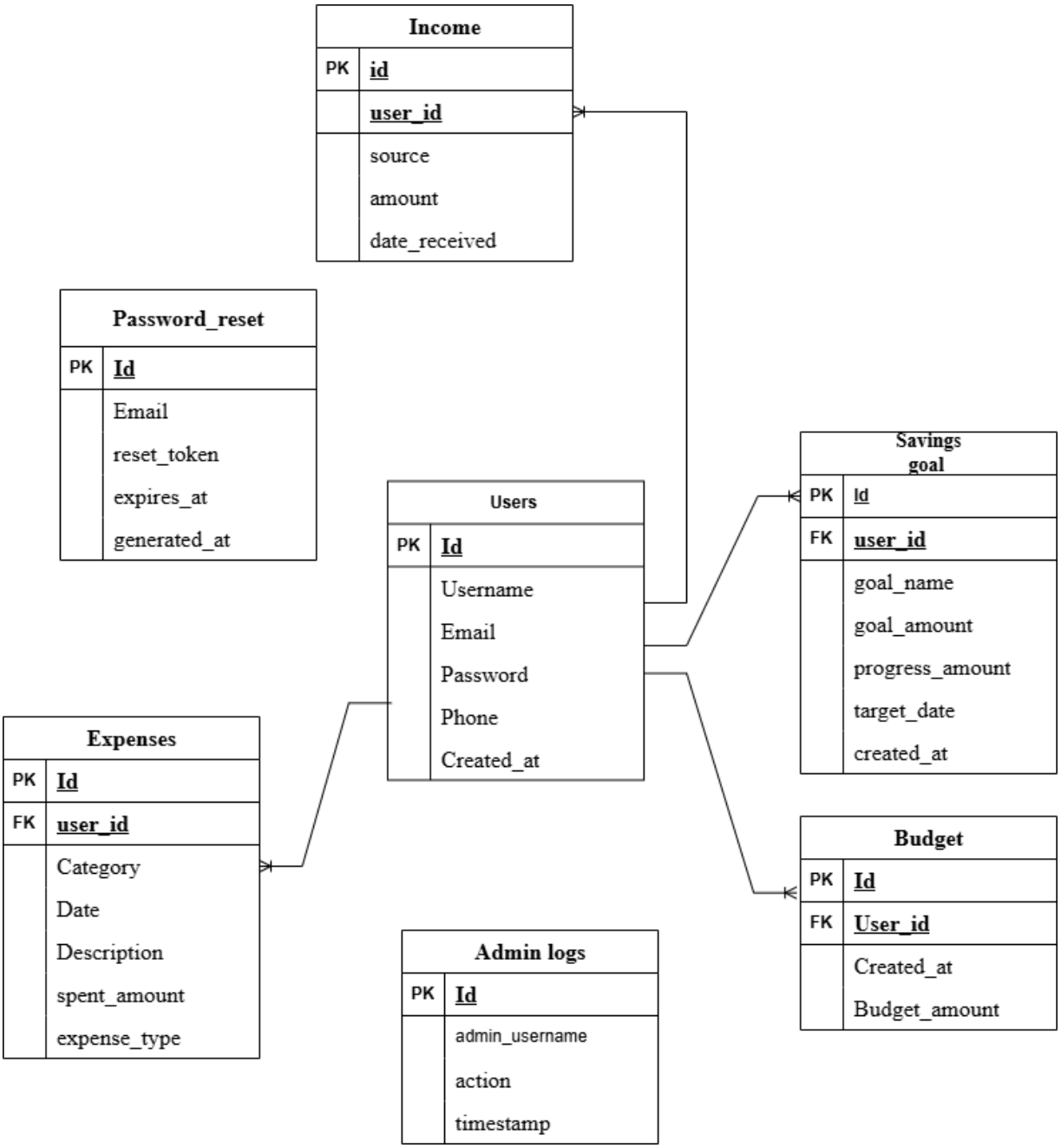


Figure: 14: Class Diagram

5.4 Database Design

The database consists of multiple tables supporting the system's functionalities. The Entity-Relationship Diagram (ERD) is presented below.

5.4.1 Entity Relationship Diagram (ERD)

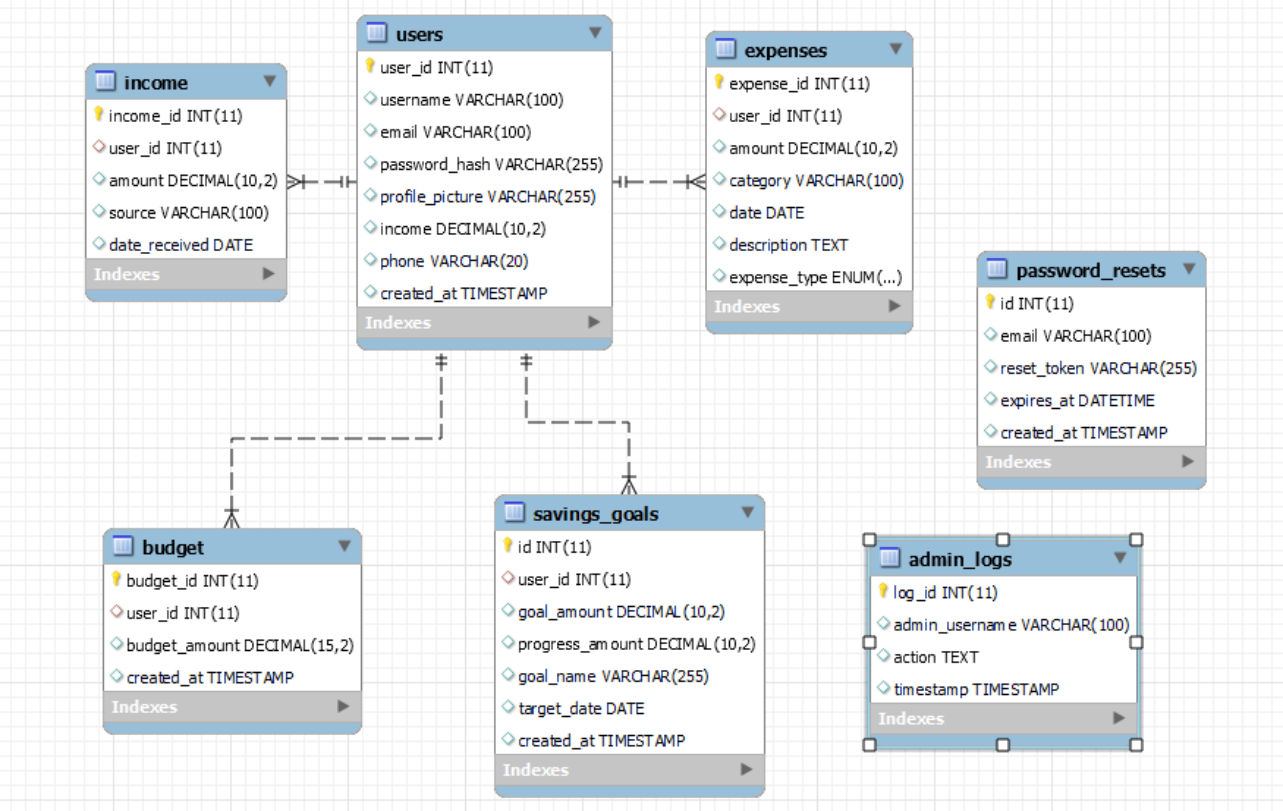


Figure: 15: ERD Diagram

5.4.2 Database Data Dictionary

Users table

Field	Data Type	Constraints	Description
Id	INT (AUTO_INCREMENT)	PRIMARY KEY	Unique identifier for each user
Username	VARCHAR	NOT NULL	Full name of the user
Email	VARCHAR(255)	UNIQUE, NOT NULL	User's email address (used for login)
Password	VARCHAR(255)	NULLABLE	User's phone number
Phone	VARCHAR(255)	NOT NULL	Hashed password for authentication
Created_at	TIMESTAMP		Date and time of user registration
Income	DECIMAL(10,2)		Monthly income associated with user

Income Table

Field	Data Type	Constraints	Description
Id	INT	PRIMARY KEY(users)	Unique identifier for each income
User_id	INT	FOREIGN KEY	User who owns the wallet
Amount	DECIMAL(10,2)	NOT NULL	Amount of income received

Date_received	DECIMAL(10,2)	DEFAULT	Date income was received.
source	VARCHAR(100)		Income source (e.g., Salary, Freelance).

Budget Table

Field	Data Type	Constraints	Description
Id	INT (AUTO_INCREMENT)	PRIMARY KEY	Unique identifier for each budget
User_id	Int	FOREIGN KEY (users)	The user who created the budget
Created at	Timestamp	NOT NULL	Timestamp of when the budget was created.
Budget_amount	DECIMAL(10,2)	NOT NULL	The set budget for this category

password_resets

Field	Data Type	Constraints	
id	INT (AUTO_INCREMENT)	PRIMARY KEY	Unique ID for the reset request.
email	VARCHAR(100)	FOREIGN KEY (users)	Email address of the user requesting reset.
reset_token	VARCHAR(255)	NOT NULL	Secure token sent to verify identity.
Generated_at	TIMESTAMP	DEFAULT CURRENT_TIMESTAMP	Timestamp of when the request was made.

Savings goal table

Field name	saved_amount	Constraints	Description
id	INT (AUTO_INCREMENT)	PRIMARY KEY	Unique identifier for each savings goal
user_id	INT (AUTO_INCREMENT)	FOREIGN KEY (users)	The user setting the goal
goal_name	VARCHAR(255)	NOT NULL	Name of the savings goal (e.g., "New Phone", "Vacation")
goal_amount	DECIMAL(10,2)	NOT NULL	The total amount needed to reach the goal
progress_amount	DECIMAL(10,2)	DEFAULT 0.00	The amount currently saved
target_date	DATE		Target date to achieve the goal.
created_at	TIMESTAMP		Timestamp of when the goal was created.

Expenses Table

Field name	Data Type	Constraints	Description
Id	INT (AUTO_INCREMENT)	PRIMARY KEY	Unique identifier for each expense
user_id	INT	FOREIGN KEY (users)	The user who recorded the expense
Expense_type	ENUM	NOT NULL)	Type of expense: fixed or miscellaneous
Category	VARCHAR(255)	NOT NULL	Expense category

			(e.g., "Food", "Utilities")
Date	DECIMAL(10,2)	NOT NULL	The amount spent
Description	TIMESTAMP	DEFAULT CURRENT_TIMESTAMP	Expense date
amount	TEXT	NULLABLE	Additional details about the expense

Admin_logs Table

Field Name	Constraints	Description
id	PRIMARY KEY	Unique identifier for each log entry.
admin_username	VARCHAR(100)	Username of the admin performing the action
action	TEXT	Description of the admin's action.
timestamp	TIMESTAMP	When the action was performed.

5.5 Test Data

The following test data is used to verify the functionality of the system:

Types of Test Data:

Valid Data

Correct inputs that conform to the systems expected format.

Example: Entering an expense of Ksh 500 in the "Food" category with a valid date.

Invalid Data

Inputs that violate system rules to check error handling.

Example: Entering a negative expense amount (Ksh -500) or an invalid date format ("abc" instead of 2024-07-10).

Boundary Data

Tests system limits, such as minimum and maximum input values.

Example: Entering Ksh 0 or Ksh 1,000,000 to verify if the system handles budget limits correctly.

Extreme Data

Tests how the system responds to unusual but possible values.

Example: Entering an expense for Ksh 999,999,999 to see if the database can store large values.

Missing Data

Checks how the system handles empty fields.

Example: Leaving the "amount" field blank and submitting the form.

5.6 Chapter Summary

This chapter focused on the design of the Personal Finance Expense Tracking and Budget Management System, ensuring a seamless transition from analysis to implementation. The system was designed to meet functional and non-functional requirements, improving expense tracking, budget management, and financial reporting through a structured approach. The User Interface Design was carefully crafted for intuitive navigation and efficient data entry. The system includes input forms for user registration, login, expenses, transactions, budget tracking, and savings goals. Additionally, reports design was implemented with financial reports, graphs, and expense breakdowns to help users analyze their spending habits. The Process Design was developed based on Data Flow Diagrams (DFDs) and focuses on key processes: User Authentication (Login/Registration), Expense Entry and Budget Tracking, Transaction Handling

(Income & Expenses), and Report Generation. Each process was further refined into flowcharts, ensuring a clear representation of decision-making and execution within the system. The Database Design includes an Entity-Relationship Diagram (ERD) that defines the database structure, including the Users Table (stores user credentials and profile information), Expenses Table (stores user expenses and categories), Budgets Table (tracks user-defined budgets and spending limits), Transactions Table (records income and spending transactions), and Savings Table (manages savings goals and progress). A data dictionary was also created to document the attributes, data types, and constraints for each database table. The system was designed with adequate test data to simulate real-world use cases. Various test cases covered valid and invalid user inputs, budget limit validations, expense tracking and savings goal calculations, and data retrieval for financial reports. By implementing these design principles, the Personal Finance Expense Tracking and Budget Management System is structured to provide an efficient, secure, and user-friendly financial management experience

CHAPTER SIX: IMPLEMENTATION

6.1 Introduction

In this chapter, the process of implementing the system is discussed. This includes the development of the user interface (UI), business logic, database structure, and module testing. The system has been built using a layered architecture to separate concerns and ensure maintainability. The chapter also covers testing conducted to verify the system's functionality.

6.2 UI Implementation

6.2.1 Input forms Implementation

The input forms were implemented with a focus on usability and validation. For example, the "Add Expense" forms checks if the user inputs the required fields, such as the category, amount, and date, before submission. Additionally, form fields were styled to match the aesthetic of the application, adhering to the pink and black theme.

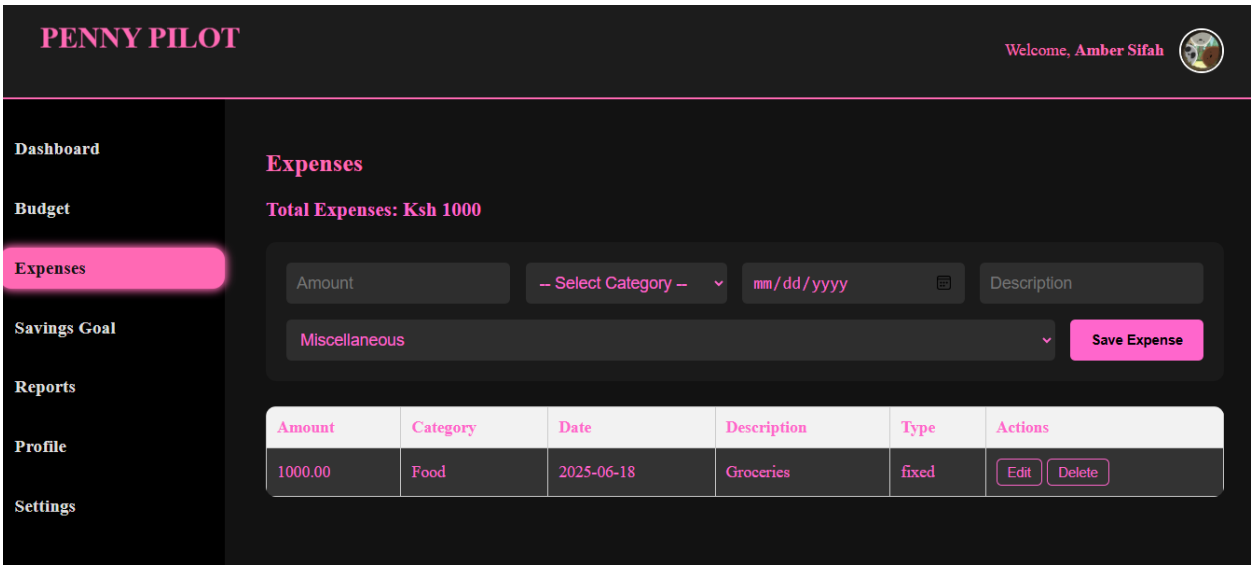


Figure: 16: Add Expense

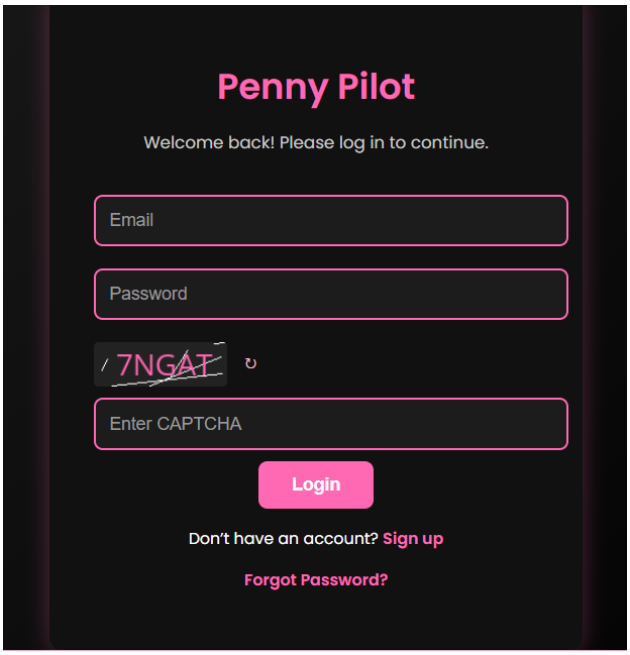


Figure: 17: User Login

6.2.2 Reports Implementation

The reports were implemented by first retrieving the necessary data from the database using SQL queries. For the **Expense Report**, data such as category, amount, date, and type of expense was extracted from the expenses table, filtered by user and date range. This data was then processed and visualized using a bar chart to show expenditure by category.

The **Savings Goal Report** retrieved goal names, target amounts, and current progress from the savings_goals table. It was displayed in a tabular format alongside a progress bar for visual feedback. Both reports were integrated into the frontend, allowing real-time interaction and filtering through a user-friendly interface.

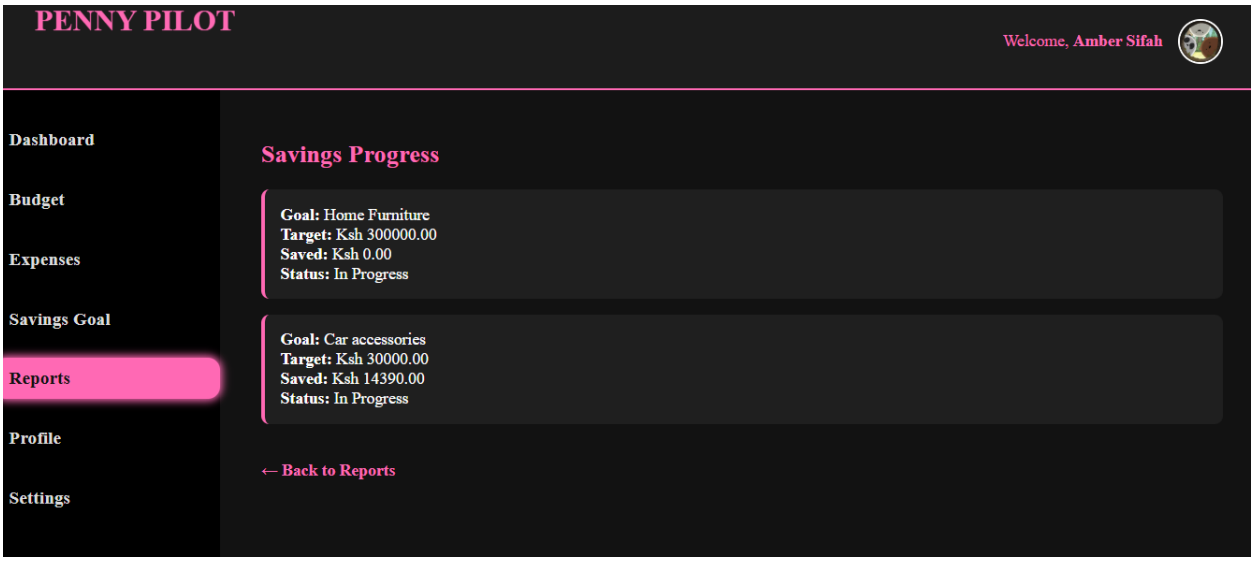


Figure: 18: Savings Progress report

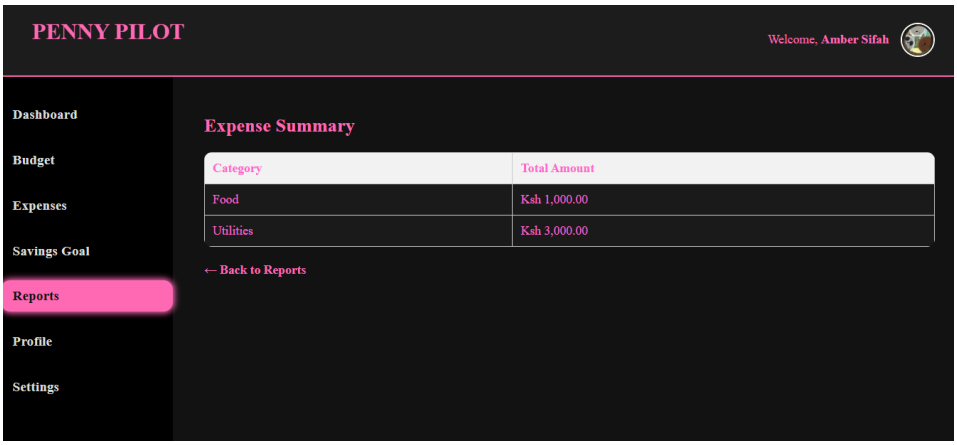


Figure: 19: Expense Summary report

6.3 ERD Implementation

The Entity-Relationship Diagram (ERD) for this system is designed to reflect the relationship between various entities such as users, budgets, and expenses. The budget table stores budget details, while the expenses table tracks each user's spending. A one-to-many relationship exists between the users and expenses tables, and a many-to-one relationship exists between expenses and budget based on the category.

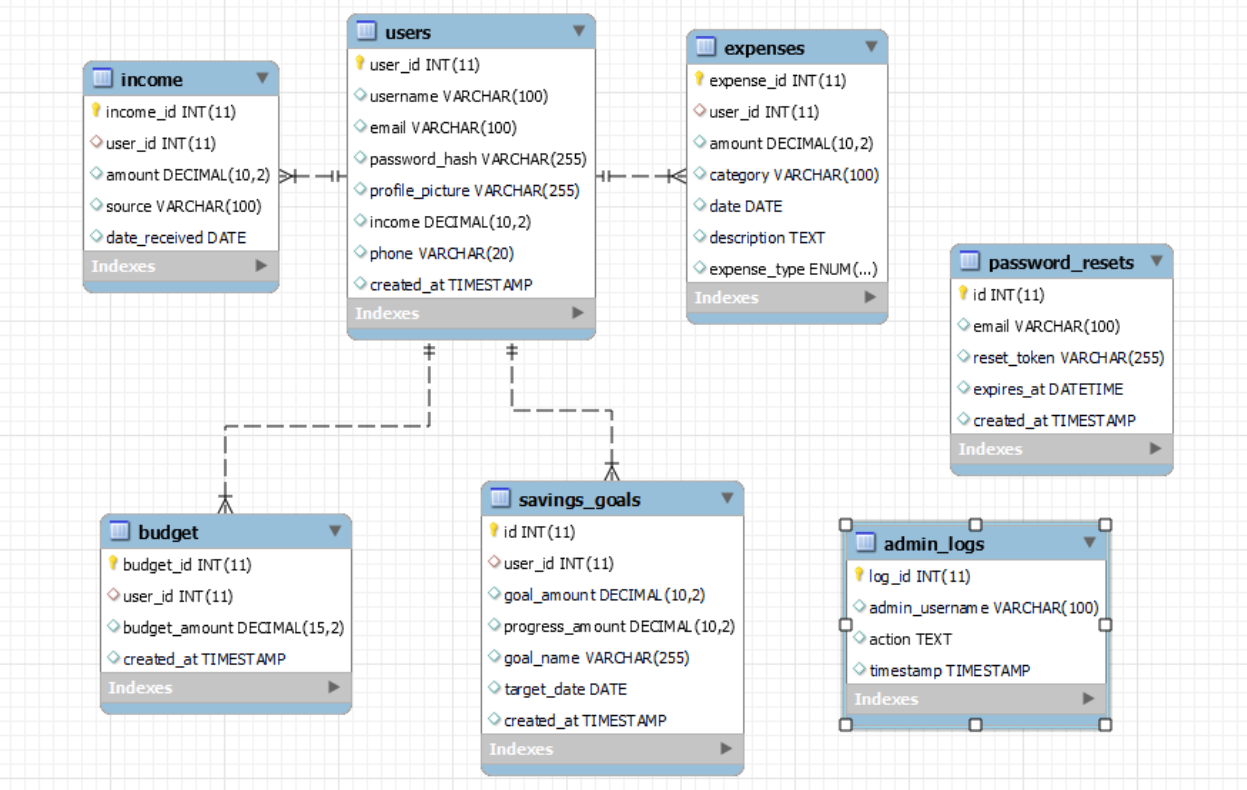


Figure: 20: DB Structure

6.4 Business Logic Implementation

Client-side Example

Client-side form validation ensures that users cannot submit incomplete or incorrect data. For instance, when adding an expense, the form checks if the user has entered both the amount and the category before submission.

```
return (
  <div className="login-container">
    <div className="login-box">
      <h1 className="login-title">Penny Pilot</h1>
      <p className="login-subtitle">Welcome back! Please log in to continue.</p>

      <form onSubmit={handleLogin}>
        <input
          type="email"
          placeholder="Email"
          className="login-input"
          value={email}
          onChange={(e) => setEmail(e.target.value)}
          required
        />
        <input
          type="password"
          placeholder="Password"
          className="login-input"
          value={password}
          onChange={(e) => setPassword(e.target.value)}
          required
        />
```

Figure: 21: Client-side code

Server-side Example

On the server side, PHP is used to interact with the database. For example, when a user submits an expense update, the server receives the data, sanitizes it, and then updates the corresponding record in the expenses table. Below is an example of how the server handles the update operation:

```
$raw_input = file_get_contents(filename: "php://input");
$data = json_decode(json: $raw_input, associative: true);

if (!$data || !isset($data['email']) || !isset($data['password']) || !isset($data['captcha'])) {
    echo json_encode(value: ["success" => false, "message" => "Missing fields"]);
    exit;
}

$email = $data['email'];
$password = $data['password'];
$captcha = $data['captcha'];

// ✅ CAPTCHA check
if (!isset($_SESSION['captcha']) || strtolower(string: $captcha) !== strtolower(string: $_SESSION['captcha'])) {
    echo json_encode(value: ["success" => false, "message" => "Invalid CAPTCHA"]);
    exit;
}
```

Figure: 22: Server-side code

6.5 Module testing

Test Case	Input	Expected Output	Actual Output
Add valid expense	Category: Food, Amount: 1000	Expense added Successfully, stored in DB	Expense added successfully

Add expense with empty category	Category: “”, Amount: 1000	Error message: “Category is required”	Error message: “Category is required”
Add expense with invalid amount	Category: Food, Amount: -1000	Error message: “Amount cannot be negative”	Error message: “Amount cannot be negative”

Report Testing: Test the "Budget vs. Actual" report by running different queries with various categories and ensuring the correct data is displayed.

6.6 Chapter summary

In this chapter, the implementation of this system was discussed. This included the development of the UI for input forms and reports, as well as the implementation of the database and business logic. Module testing was conducted to ensure the system operates as expected. The system is now fully functional, with successful data handling and display, providing users with a seamless experience for managing their finances.

CHAPTER SEVEN: FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

This chapter presents a summary of the key findings from the project, the conclusions drawn based on those findings, and recommendations for future improvements and further research. The aim was to design and implement a personal finance tracker that helps users manage their income, expenses, budget, and savings goals in a structured and user-friendly way.

7.2 Findings

7.2.1 Achievement of Objectives

The primary objectives of the project were successfully achieved:

A user-friendly system was developed using a React frontend and a PHP/MySQL backend, with admin support using Python.

Users can register, log in, and manage their personal financial data, including income, expenses, budgets, and savings goals.

Real-time reports such as Expense Report and Savings Goal Progress were implemented with visual charts and filtering features.

An admin panel was integrated to view user data and logs, enhancing system transparency without compromising data integrity.

Security features such as OTP login and password reset with tokens were also included to safeguard user access.

These features align closely with the system requirements defined at the start of the project.

7.2.2 Challenges

Despite the successful development of the system, several challenges were encountered:

Time constraints made it difficult to integrate all planned features, such as automated income prediction or AI-based financial advice.

Ensuring real-time synchronization between multiple tables (like updating budget automatically from new income) required advanced logic and testing.

Admin panel implementation in Python (Tkinter) introduced compatibility and styling limitations compared to web-based dashboards.

Styling and responsive design in React took considerable time due to the need for a polished and intuitive user experience.

7.3 Conclusions

The developed solution successfully meets the intended goals of helping users track and manage their personal finances. It provides a functional, interactive platform with a clean user interface, real-time data interaction, and secure user management. The inclusion of visual reports and admin oversight strengthens the system's usability and maintainability. Overall, the system proves highly applicable for individuals seeking better financial awareness and control.

7.4 Recommendations

While the core system is complete and functional, future improvements can be made:

Implement mobile responsiveness or a mobile app version for greater accessibility.

Add AI-powered financial insights, such as saving recommendations or budget alerts.

Introduce data analytics for historical trends and predictive financial planning.

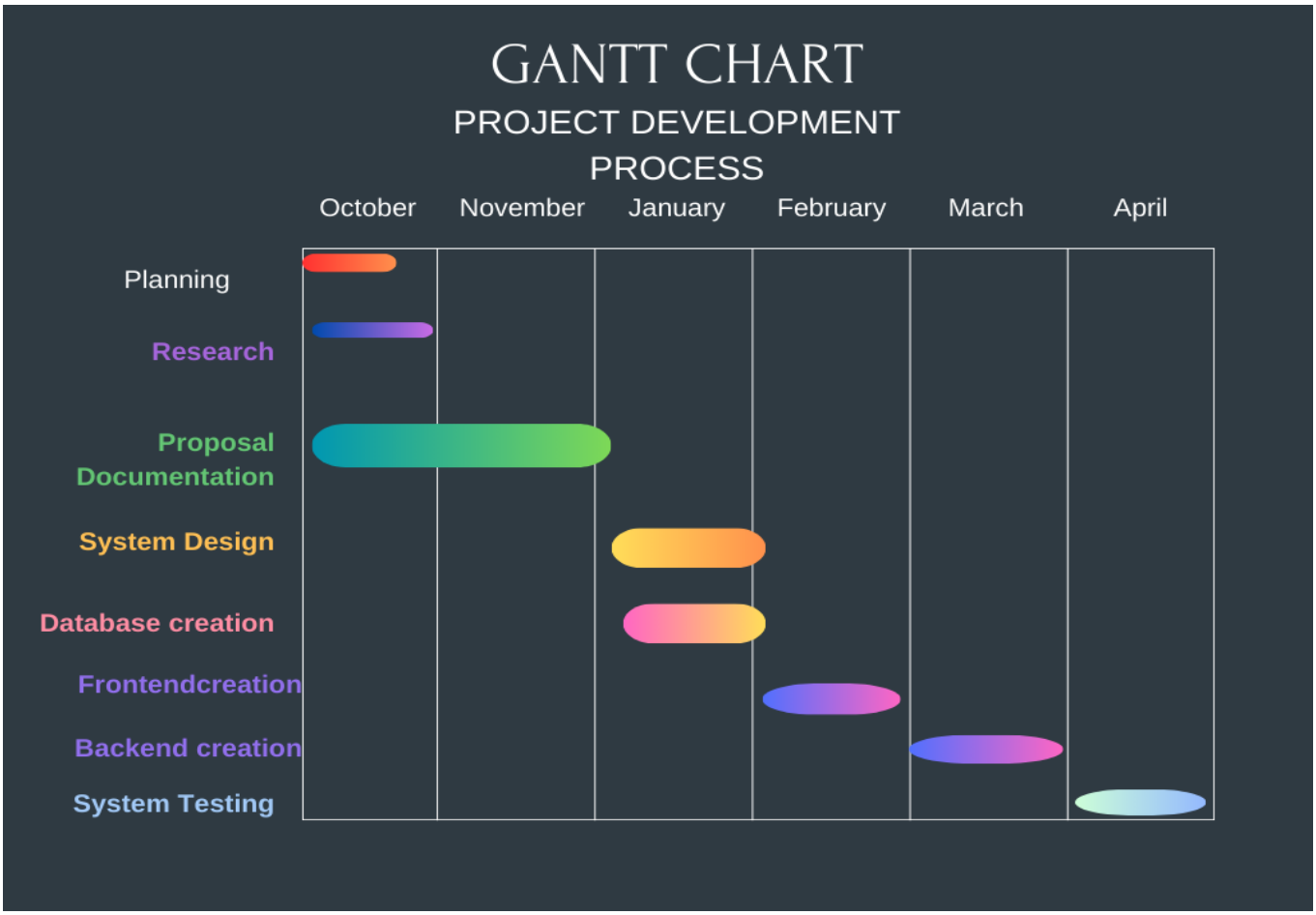
Improve the admin panel with a web-based interface for easier scalability and aesthetics.

Expand to support multiple currencies and language localization for broader user coverage.

Integrate with bank APIs for automatic transaction syncing and verification.

Future researchers or developers building upon this system can explore these areas to expand its scope and value.

Project Schedule



1 Project Schedule

Project Resources

Being a solo contributor, I am solely responsible for all activities, which include proposing, designing, implementing, and deploying the system. Below are the resources needed to support me in this work

Human Resources

Researcher and Developer (Self): This role will involve all phases of the project, including requirement elicitation, system design, implementation, testing, and deployment. Qualification: Bachelor's degree in Computer Science (in progress).

Equipment

Laptop: Minimum - Intel Core i7 processor, 16GB RAM, 512GB SSD, 15.6-inch display.

External Hard Drive: Minimum 2TB, USB 3.0 compatible.

Software Tools

Development IDE: Visual Studio Code.

Database Management System: MySQL.

Version Control System: GitHub

Project Budget

ITEMS	QUANTITY	PRICE (KSH)
Transport		22,000
Devices(Computer/mobile phone)	1	55,000
Airtime		33,000
Printing questionnaire and proposal document	2	2200
Miscellaneous		15,000
Buy application program		20,000
TOTAL		**133,700**

2 Project Budget

Chapter Summary

The current chapter highlighted the project schedule, resources, and budget. A very detailed Gantt chart was presented, showing when the completion of each part of the project will be. The specifications of resources ensure that the requirements of the project are well met. Lastly, the contingency in the budget accounts for all unforeseen costs.

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Appendix

Sample Questionnaire

1. Demographic Information

[ ] Age:

[ ] Gender:

[ ] Occupation:

[ ] Monthly Income:

[ ] Educational Background:

2. Current Financial Management Practices

[ ] How do you currently track your expenses and manage your budget?

[ ] Do you use any software or apps for financial management? If yes, please specify.

[ ] On a scale of 1 to 5, how satisfied are you with your current financial management system?

3. Financial Goals and Objectives

[ ] What are your short-term and long-term financial goals?

[ ] How frequently do you review your financial goals and progress?

[ ] What challenges do you face in achieving your financial goals?

4. Expense Tracking Preferences

[ ] Would you prefer manual entry or automatic syncing of transactions for expense tracking?

[ ] What categories of expenses are most important for you to track?

[ ] How often would you like to receive expense reports or summaries?

5. Budgeting Preferences

[ ] How do you currently create and manage your budget?

[ ] Would you prefer a flexible or strict budgeting approach?

[ ] Are there any specific features or functionalities you would like to see in a budgeting tool?

6. User Interface and Accessibility

[ ] What devices do you primarily use for financial management (e.g., smartphone, computer, and tablet)?

[ ] How important is mobile accessibility for you in a financial management system?

[ ] What features would make the user interface more intuitive and user-friendly for you?

7. Data Security and Privacy

[ ] How concerned are you about the security of your financial data?

[ ] What measures would you expect to ensure the security and privacy of your financial information?

[ ] Are there any specific security features you would like to see in a financial management system?

Feedback and Suggestions

[ ] Do you have any additional feedback or suggestions for improving financial management tools?

[ ] Is there anything else you would like to share about your financial management needs and preferences?